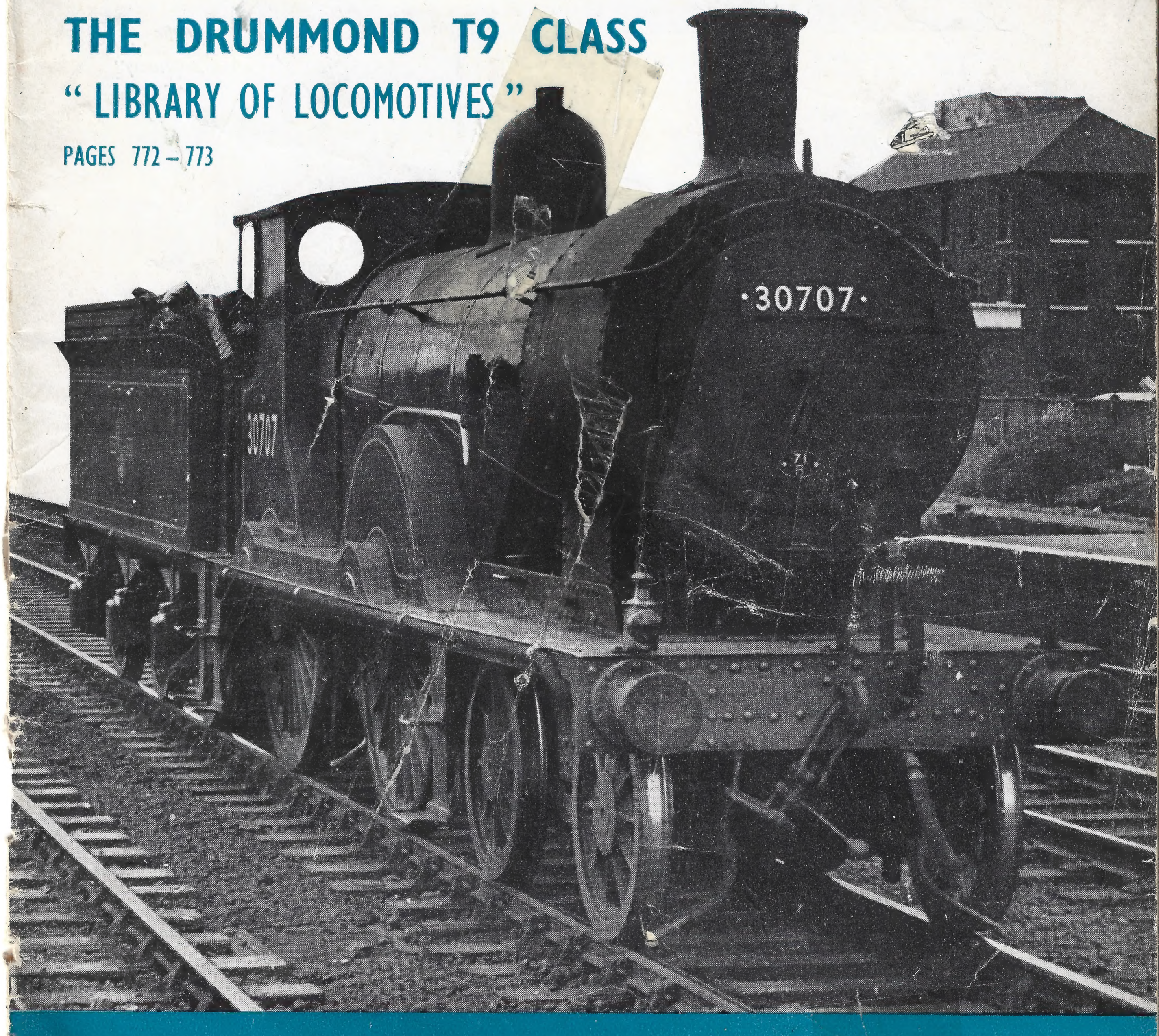
# Model Engineer

THE MAGAZINE FOR THE MECHANICALLY MINDED

## THE DRUMMOND T9 CLASS

"LIBRARY OF LOCOMOTIVES"

PAGES 772 – 773




ONE SHILLING 23 JUNE 1960 VOL 122 NO 3076

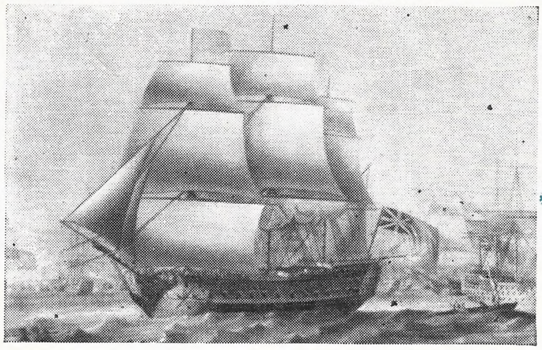
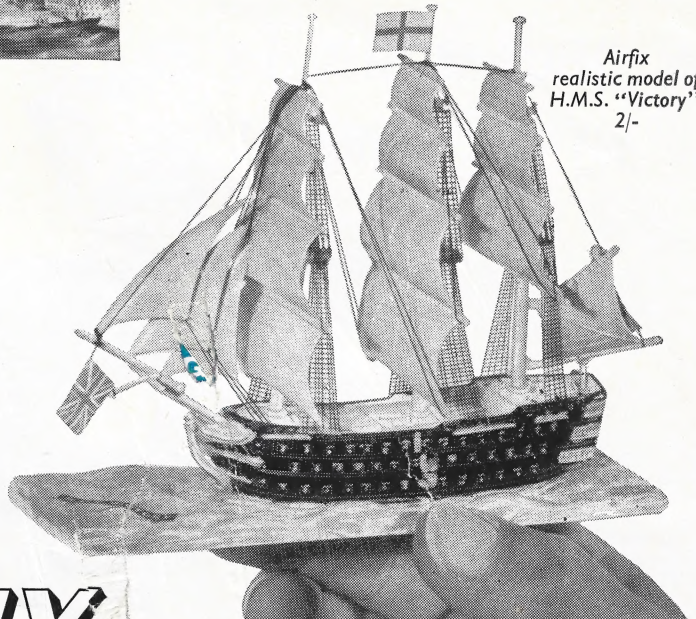


Illustration by permission of National Maritime Museum

# Just like the real thing!

**Airfix kits are not just models — they're exact replicas, each series to a constant scale.**



*Airfix realistic model of H.M.S. "Victory" 2/-*

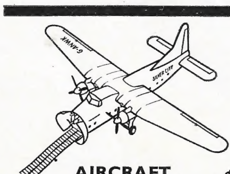
There are models galore in the Airfix range! Aircraft from fighters to bombers (*all* to the same 1/72nd scale), 00 gauge railway accessories, vintage cars, historical ships. Airfix value is *unbeatable* — ask your dealer for the latest list.

**Nearly 100 kits from 2/- to 10/6**

# AIRFIX

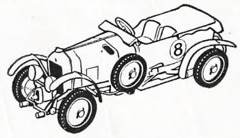
**THE WORLD'S GREATEST VALUE IN CONSTRUCTION KITS**

*From Model and Hobby Shops, Toy Shops and F. W. Woolworth*



**AIRCRAFT**

*Bristol Superfreighter 7/6d.*

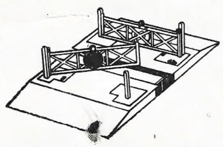


**VINTAGE CARS**

*1930 Bentley 2/-*

**MODEL FIGURES**

*Lifeguard 2/-*



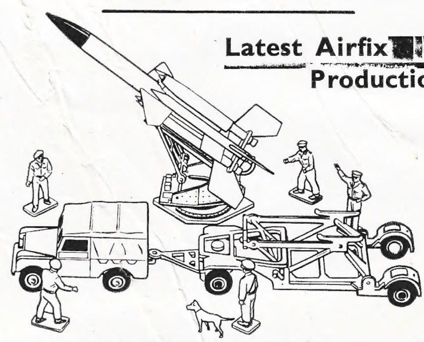
**TRACKSIDE SERIES**

*Level Crossing 2/-*

[S159]

## STOP PRESS!

**Latest Airfix Production**



**BRISTOL BLOODHOUND**

A natural addition to the 1/72nd scale Aircraft series, this new kit is complete in every detail, down to actual moving parts. It consists of a detachable missile, launcher, carrier, Land Rover, 5-man crew and their mascot dog. 64 parts— and all for the incredible price of only **2/-**.

***ALSO NEW:***

1/72nd scale Messerschmitt ME262A, **2/-**.

# Model Engineer

Incorporating Mechanics (Home Mechanics and English Mechanics) and Ships and Ship Models


IN THIS ISSUE


749 Smoke Rings
751 Gravity escapement clock
754 Flat twin
757 Workshop hints
758 Stronghold of steam
760 Paris exhibition and Birmingham rally
763 Rust on the track
764 Moorcock
766 Travelling jib crane
768 Springbok
771 Ship modelling notes
772 Library of locomotives
774 Readers' queries
776 Postbag
779 Club news


NEXT WEEK

Tribute to Mr J. N. Maskelyne

Poole regatta report

Spindle for the EW lathe


ONE SHILLING · 23 JUNE 1960
VOL 122 · NO 3076

Published every Thursday
Subscription 65s. (USA and Canada $9.25), post free

The Editor is pleased to consider contributions for publication in MODEL ENGINEER. Manuscripts should be accompanied by photographs and/or drawings and should have a stamped addressed envelope for their return if unsuitable.



19/20 Noel Street, London W1.
GERrard 8811


A WEEKLY COMMENTARY

# Smoke Rings

By VULCAN

WHEN the article "Mistakes in Painting Model Locomotives" appeared in our issue of June 16 we believed this to be the last one that Mr Maskelyne wrote for the series "Locomotive Details in Miniature" before his sudden death last month.

In searching through her husband's papers, however, Mrs Maskelyne discovered another article which he had completed for this series but for which he had not apparently prepared the drawings.

We are, of course, delighted to receive this unexpected article, and we are grateful to Mrs Maskelyne for her thoughtfulness in sending it on to us. We hope to publish it in our issue of July 14, and to compensate for the absence of drawings Martin Evans has promised to look out a few photographs to illustrate some of the points discussed by Mr Maskelyne. The article will be about valances and footsteps.

## New tug series

OLIVER SMITH, our staff engineer who has just finished building the ME Beam Engine recently described in these pages, and who is contributing a current series about tug details and fittings, has just begun another series which should please the ship modelling enthusiasts.

Directed principally to the beginner who would like to make a serious attempt at a working model, the new series will provide intimate constructional information for building a model of the *Moorcock*, one of the latest Thames tugs. It is thought to be the first constructional article about a diesel-powered tug.

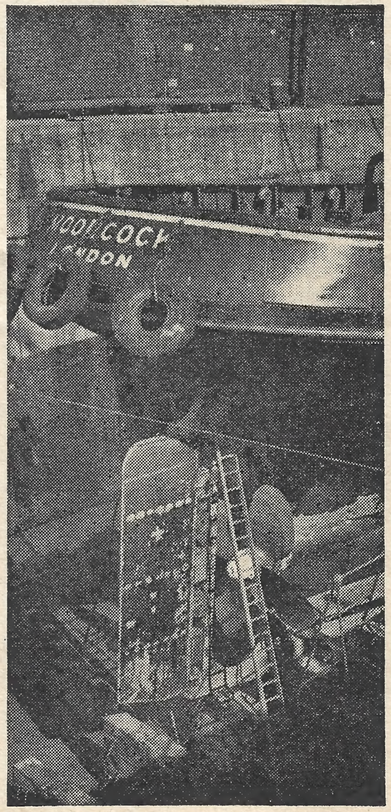
## Very co-operative

In searching out the details for his articles, Mr Smith received excellent co-operation from Mr Fleming of Ship Towage, who operate *Moorcock* and who placed plans at Mr Smith's disposal and organised facilities for him and our photographer, Mr Brian Western, to visit the Ayr Engineering Co. when the tug was in dry dock. The result was a fine collection of photographs which will be used to illustrate the series.

Incidentally, it was the firm of Ship Towage which was responsible for berthing the *Cutty Sark* in its now historic site at Greenwich.

Mr Aitken, of Richard Dunston, was also very helpful and gave permission for the reproduction of details from the official drawings.

Mr Smith tells me that a member of the Bethnal Green and Shoreditch Institute, where he teaches model engineering, is to build the model in accordance with the instructions printed in MODEL ENGINEER, which will allow the author to keep closely in touch with any snags that the beginner might encounter.




*This stern view of the* MOORCOCK, *taken when she was in dry dock, clearly illustrates the design of the rudder and the form and pitch of the propeller.*

## Newcomer

CMDR W. N. DRAWBRIDGE, who contributes the fortnightly ship modelling notes of great value to enthusiasts who build small replicas of sailing craft, is a newcomer to the pages of MODEL ENGINEER.

A retired naval commander, he has seen 36 years' service in Her Majesty's ships and has served—with the exception of submarines—in nearly every type of warship.

Like most sailors, he has sailed in many waters of the world—in fact one commission was in the nature of a global journey, that was when his ship HMS *Renown*, the battle cruiser, took the Prince of Wales on an Empire tour. Also like many deep sea sailors his profession engendered in him a profound love of ships.

During his years with the Royal Navy he devoted considerable time to research in seamanship. Now he is retired, the exquisite model which is taking shape in his immaculate workshop in Kensington and his fortnightly articles keep evergreen the memory of the sea.

## Versatile

It is these factors, his love of and long association with the sea, and his research into the fundamentals of seamanship, which bring to the Commander's articles an air of quiet authenticity.

The sketches which accompany his text are his own work—just another aspect of the many parts which go to make Commander Drawbridge—and they illustrate not only his articles but the painstaking care with which he tackles every subject.

Other interesting facets of his character emerged when I lunched with him last week. I was surprised to learn that in addition to model making, sketching and writing he is also an accomplished furniture designer and cabinet maker. And for keeping himself young he finds time to indulge in a little target practice —Robin Hood style ! This is a little less strenuous than rugger and hockey of earlier years.

## Build or buy ?

MODEL engineers are often faced with the choice of obtaining some component, or item of equipment, ready made, or making it entirely for themselves. There is no doubt that time and trouble are important factors in making a decision, but often the matter of cost is also involved, and I am often asked by readers whether it would " pay them " to make certain parts, or whether the money saved in this way would be appreciable, as compared with the purchased article.

To my mind, however, there is, or should be, yet another important factor to be considered, though apparently it has been overlooked by many of my querists.

Model engineering can only be successfully pursued if one is primarily interested in *making* things; if either the cost or the trouble involved in doing so is regarded as a predominant factor, it is reduced to a dull utilitarian level, and its value as a creative pastime is diminished.

## Avoiding tedious work

Many of us buy minor items in the way of standard manufactured parts to incorporate in our models, and thereby save a lot of time in their construction, besides avoiding much tedious repetitous work; and nobody can be blamed for taking this course. On the other hand, quite a few model engineers make everything, down to the last nut, bolt and screw, and thoroughly enjoy doing so.

Motives and intentions are personal affairs, and the really important thing about model engineering is that it should give pleasure in the execution and satisfaction in the ultimate result.

The policies and methods adopted to attain these ends are immaterial, neither does it matter which of them is foremost in the mind of the person concerned. Purely mercenary considerations rarely influence true enthusiasts; how many of my readers, I wonder, would pause to look up a price list to find how much they could save by making a component instead of buying it ?

One can buy service, and even buy *time*, in the sense that it concerns the completion of a model; but can one buy the thrill of fashioning things from raw lifeless materials, and the satisfaction of " something attempted, something done " ?

### Cover picture

*T9 class 4-4-0 locomotive No 30707 at Eastleigh, Hants. On page 772 Robin Orchard contributes further data about this class of engine in his " Library of Locomotives " series.*

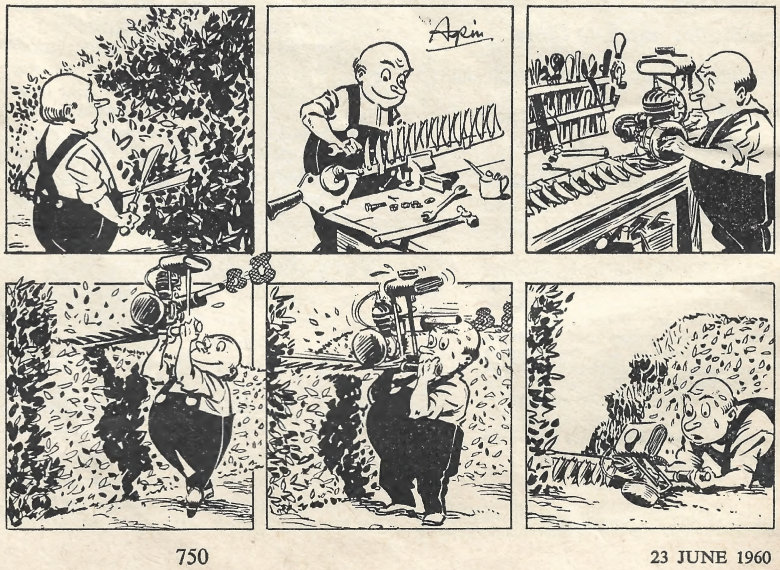
## George Gentry

GEORGE GENTRY, that spry octagenarian who is such a familiar figure at the annual Exhibition and whose name is a household word in model engineering circles, is in St James Hospital, Balham.

He was knocked down by a car on May 12, sustaining a broken leg and a head wound. But I am happy to report that though well into his eighties, Mr Gentry is making good progress and hopes to leave hospital in a short while.

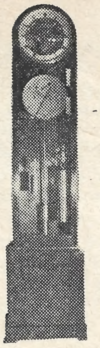
Mr Westbury visited him last week and found the patient bright and cheerful. We send our good wishes to Mr Gentry for a speedy recovery.

**CHUCK . . . . . . THE MUDDLE ENGINEER**



Continued from 9 June 1960, pages 691 to 693

# Making wheels, and pinions, and other parts



**Continuing his description of the building of this clock, C. B. REEVE explains the solution to some tricky problems**

THE centre wheel Fig. 7 and Fig. 8(*A*) contains 96 teeth and the thickness is $\frac{1}{16}$ in. as are all the other wheels. A plan view of this wheel is shown in Fig. 8(*A*). Its diameter is approximately $2\frac{5}{16}$ in. The crossing out of the arms of the wheel is done with a piercing saw, and the more carefully they are cut the less filing up afterwards will be necessary. After draw filing they should be finished with small emerysticks.

The centre wheel arbor, Fig. 7(*B*), is made from a length of blued pivot steel diameter 32 gauge drill size (practically $\frac{1}{8}$ in. dia.) which is obtainable in $4\frac{1}{2}$ in. lengths. I cut the pinion head myself, but pinion wire can be obtained commercially at a reasonable price.

### Making the pinion head

Cut off a short piece of pinion wire and insert it in a suitable size collet chuck. If no collet chuck is available, insert a piece of brass rod in a self-centring chuck drill and bore a hole to be a tight fit to the pinion wire. Before inserting be sure to remove all burrs.

Face off the end of the wire, centre drill it with a small slocumb drill and drill up to a size slightly under that of the diameter of the pivot steel. Pass a small rod through the mandrel of the lathe and knock out the piece of pinion wire without disturbing the brass bush, re-insert the pinion head the reverse way round and face off the end. All burrs should now be removed at both ends of the holes and the pinion head fitted to the arbor by a press on fit. The arbor should have both ends turned to a cone as in Fig. 7(*C*). One end of the arbor must be reduced by fine turning followed by treatment by fine emerystick so that the pinion head is a good press on fit. Before pressing on the pinion head it is finished in all respects and will require to be hardened and the temper let down to a deep purple. The spaces between the leaves should be deepened if necessary and well polished.

A convenient way to press on the pinion head is to insert the arbor in the self-centring chuck and screw up the jaws quite tight. Then position the pinion head on the end of the arbor (a short length at the extreme end of the latter can be turned down for a short distance to be an easy fit to the pinion head). Insert the drill chuck in the tailstock barrel, lock the tailstock in a suitable position on the lathe bed open the jaws of the drill chuck so that they will clear the diameter of the arbor but will bear on the face of the pinion head, and then feed in the screw of the tailstock barrel and the pinion head will travel along the arbor to the desired position.

### Turning by hand

Hand turning tools are most useful for this kind of fitting work. In fact, it is astonishing what can be done with a graver and hand rest. A brass collet is pressed on behind the pinion head. A spigot is turned on the collet to fit the hole in the wheel approximately $\frac{3}{16}$ in. diameter. The wheel is attached to the collet by three countersunk 10 BA screws. The front pivot of the arbor is formed from a piece of silver steel rod which is pressed on to the arbor in a manner similar to that of the pinion head. When fitted it is reduced in diameter and a shoulder formed for the pivot. The turning of the back pivot is better left till later. A hole at the end of the front pivot is drilled and tapped 12 BA to take the small setscrew Fig. 7(*B*). This should not be done now as the cone centre at the end of the arbor must be preserved until the wheel and pinion have been planted in the frame. Before the blue pivot steel can be drilled it must be well annealed by heating.

The third wheel and pinion, Fig. 8 (*B*) and (*C*), is built up in the same way as the centre wheel and pinion. The wheel contains 90 teeth which are cut with the same cutter as was used on the centre wheel. The pinion head has 12 leaves and is of the same diameter as that of the centre wheel pinion head.

The fourth wheel and pinion, Fig. 8 (*D*) and (*E*), is the same in all respects as the third wheel and the pinion head. Note the side of the collet against which the wheel fits. In turning these slender arbors, some difficulty may occur due to the springiness of the arbor. Some form of improvised backstay will overcome this snag.

### Escape wheel and pinion

The escape wheel and pinion, Fig. 8(*F*) and (*G*), should be cut out of a piece of gauge steel plate 3/64 in. thick. The hole is bored approximately 28 gauge drill size and is threaded with a 5/32 in. × 60 thread tap. To get the four teeth of equal length, the wheel should be screwed on to its collet, which has been previously fitted to the pinion arbor. If the arbor is then placed between centres in the lathe and the hand-rest brought close to the ends of the teeth, it will be quite an easy matter to make the teeth of equal length. The collet is pressed on to the pinion arbor, turned to size in position and carefully threaded right up to the shoulder. This can usually be done by reversing the position of the die. Scribe a circle of 9/32 in. dia. at the centre of the escape wheel and with a division plate drill eight holes tapping size for No. 12 BA screws (gauge drill No 62). Drill the holes carefully and remove all burrs after tapping. Four screws are inserted in the front and four in the back of the wheel.

The threaded part of all the screws is turned away where they protrude beyond the thickness of the wheel and the diameter finished to approximately 0.035 in. They should then be well smoothed, polished and burnished. Their length can be just under $\frac{3}{16}$ in. measured from the surface of the escape wheel.

The escape wheel should be made smooth on all surfaces and finally polished with No 02 emerystick. The tips of the teeth can be hardened, but I do not consider this necessary. Fig. 8(*H*) shows a small recess turned in the escape wheel arbor. This is to accommodate the friction springs of the fly. It is better slightly to round the corners of the shoulders so that the spring can easily be fitted or removed during the assembling or dismantling of the movement.

The fly, Fig. 8(*J*) and (*K*) is made from thin brass 1/32 in. thick or less. It should be made somewhat longer than the size specified and can be reduced as necessary after the movement has been assembled. To make this component, drill a short piece of 5/32 in. dia. brass rod. Drill the hole of such a diameter that it is an easy revolving fit in the arbor. Cut a window in a piece of 1/32 in. brass so that the brass tube just fits the opening. Arrange the brass tube to protrude equally on each side of the brass strip. Silver solder the tube in position. Afterwards the fly can be shaped out and the window cut in the tube and the wings of the fly. A friction spring (*L*) can be made from a scrap of clock spring.

The maintaining click, Fig. 9 (*A*)

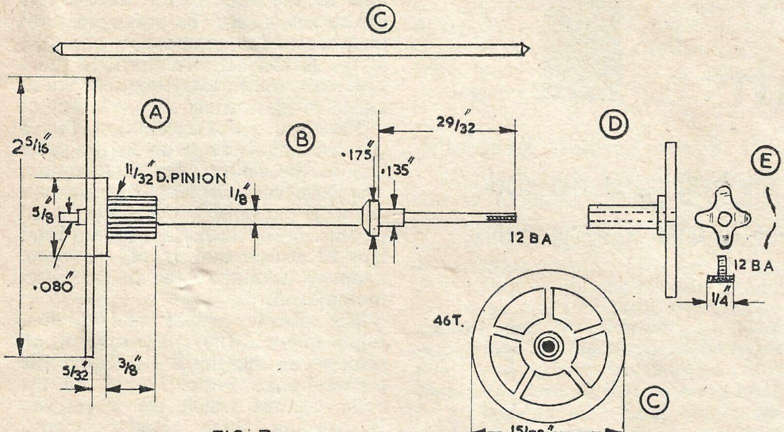
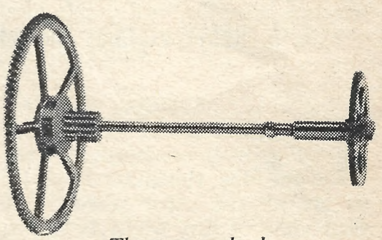



FIG. 7



*The centre wheel*

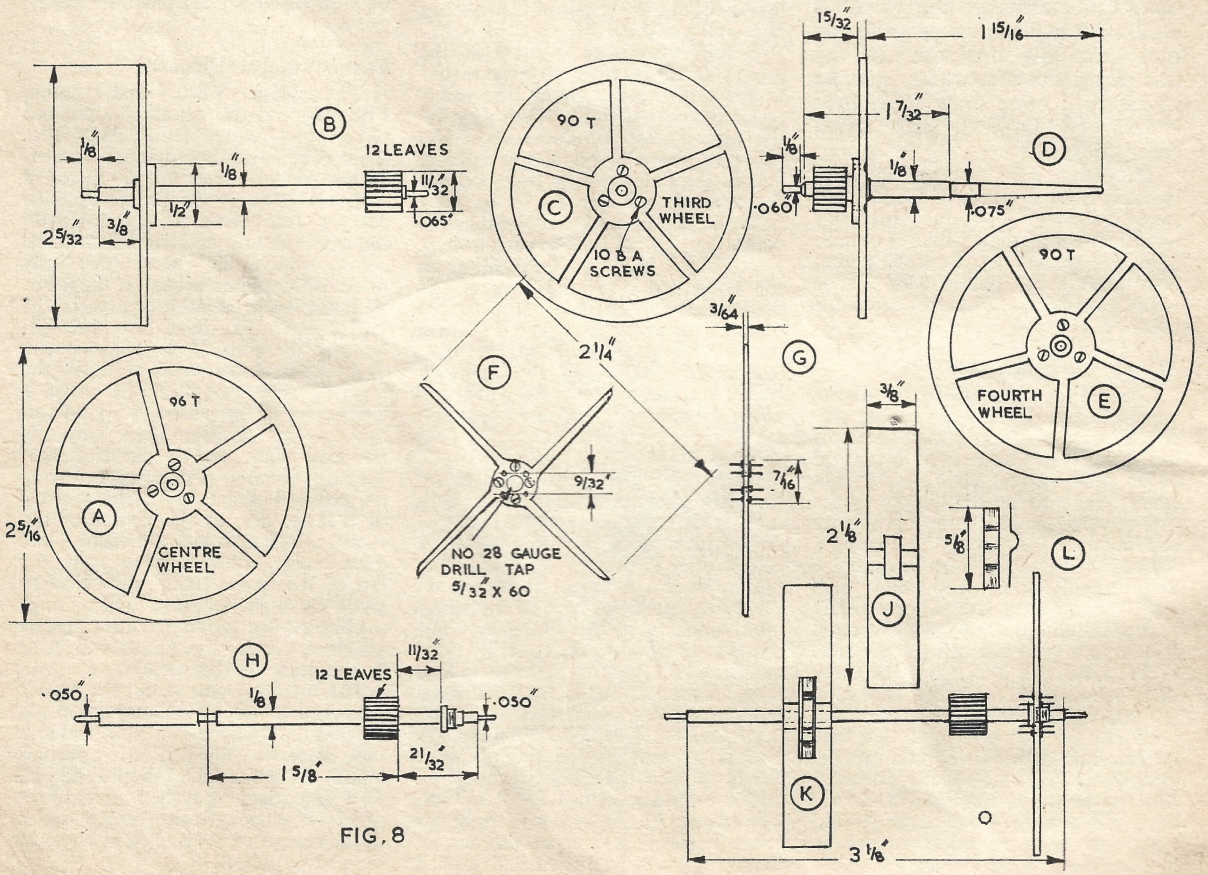



FIG. 8

and (*B*), is a straightforward job. The arbor is pivoted in the same way as the wheel arbors. A brass collet is made and pressed on to the arbor and turned in position to receive the click itself. It is fixed to the collet with two 10 BA screws. Its point drops into the teeth of the maintaining ratchet next to the great wheel as shown in Fig. 2.

In operation the driving weight of the clock will compress the spring within the great wheel and as the great wheel and maintaining ratchet wheel rotate, the point of the maintaining click will always be trailing and falling into one of the teeth on the maintaining ratchet wheel. It is only when winding the clock that the maintaining power comes into use. The point of the click will then prevent both the maintaining ratchet wheel and the great wheel from the tendency to rotate backwards. There will be, still, a forward movement of these two wheels due to the internal spring expanding. The pressure of the spring is weaker than the force of the driving wheel but quite sufficient to keep the movement going during the winding up operations.

The clock has now arrived at the stage when wheels and pinions can be pivoted in the frame. To get the various centres positioned some form of depthing tool must be contrived. Constructors will probably have their own ideas as to this gadget. One way of doing it is to get a strip of brass and drill two holes to fit the pivots of the arbors rather too closely. Hammer the brass in between the holes so as to stretch the metal. Try the meshing of the wheel and pinion together and when satisfied that the depth is right, the brass strip can be used as a jig for drilling the holes in the plate of the frame.

### The pivots

The pivoting should next be done. Start with the centre wheel and pinion. The front pivot will probably have already been made so the pinion arbor can be notched with a fine file to get the position of the back shoulder to the pivot, $2\frac{9}{16}$ in. being the distance apart of the plates. The distance between the shoulders of the pivots should be slightly less than this, but it is preferable to measure locally the position on the plates that the wheel and pinion will occupy. The reason is that the flatness and truth of the plates in relation to each other cannot always be relied on. The pivoting can be done with a tool in the slide rest but if possible it is better done by hand with a graver and hand-rest. Fig. 2 shows the general layout of the train. (*GW*) is the great wheel, (*CW*) the centre wheel, (*TW*) is the third wheel, (*FW*) the fourth wheel, and (*EW*) the escape wheel. With the exception of the third wheel, all the other wheels are on the centre line. It should be noted that the fourth wheel occupies the centre position on the movement plates. It is better to leave the pivoting of the fourth wheel and escape wheel arbors until the bridges have been made. The shape of the front bridge is in the form of a cross, see Fig. 2.

★ *To be continued on July 7*

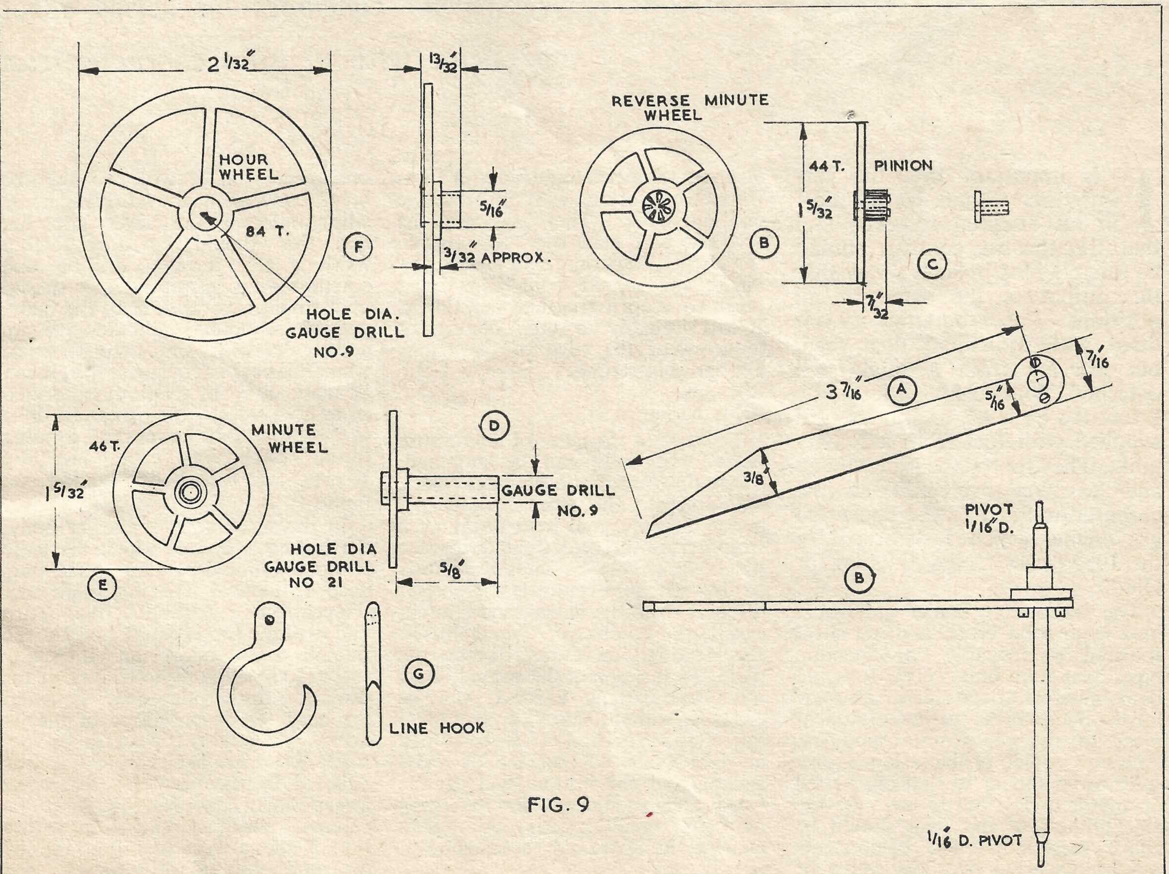
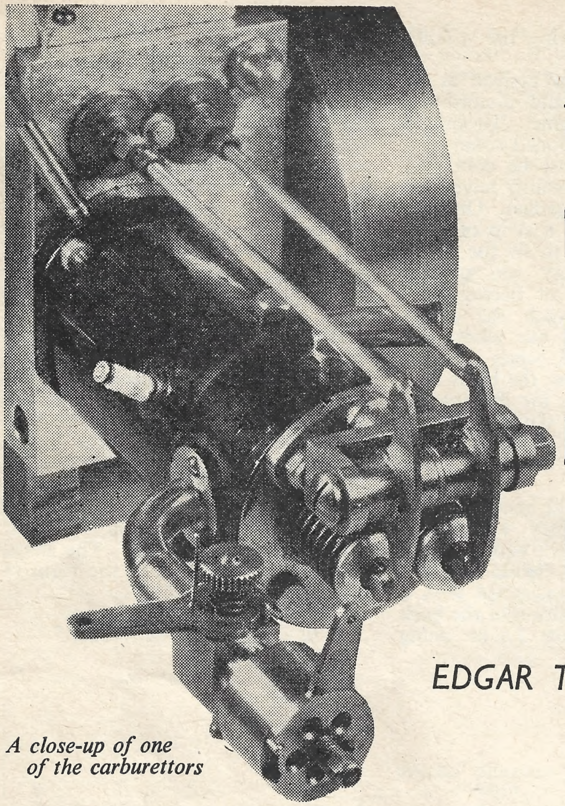



FIG. 9



A close-up of one of the carburettors



*Continued from 9 June 1960, pages 694 to 699*

# TWIN CARBURETTORS AND FINAL DETAILS

*EDGAR T. WESTBURY concludes his series about an engine with unusual characteristics*

It is important that the carburettors should be identical in all essential respects, and that the throttle controls should be intercoupled in such a way that the output is the same in all positions. The carburettors are not fitted with individual float feed, but are fed from a single and detached float chamber, slightly below the jet level, and in its turn supplied with fuel from a gravity tank. They follow the same design and working principles as the carburettor fitted to the converted gas engine which I described in the 1952 series " New Engines for Old."

The carburettor bodies are machined from solid brass, and are silver soldered permanently to induction pipes bent from brass tube. It would be permissible to use aluminium alloy for the bodies if the method of attachment to the pipes were modified, such as by union or flange joints, or a split clamp similar to that often used on motor cycles; but in any case the air tightness of the joint should be above suspicion. The components can be machined over the whole of the outside, and most of the inside, at one setting before parting off from the bar, by working with the discharge end outwards. They may then be reversed and held over the outside for facing, tapering and flaring the intake end of the bore, care being taken to keep it true and concentric. It will probably be found convenient to screwcut the edge of the flange also at this setting.

**Cross boring**

To machine the bore for the throttle barrel, the body can be mounted, flange downwards on an angle plate, not forgetting the usual slip of paper under the face, and held down by a strap across the outlet end, with two bolts. It should be set up carefully so that the bore centre is the correct distance from the flange, and straight across the middle of the diameter. If a locating plug is fitted to the angle plate, the location of the second body, after the first is finished, can be ensured without another setting-up operation. The bodies can be turned at right angles to machine the sides square, and the bottom end can be faced and shouldered by mounting on a stub mandrel, taking care not to damage the bore; only a wringing fit is necessary.

The throttle plug can be made in one piece, but it will probably be more convenient to fabricate it by silver-soldering the lever arm on, and this should be done before finishing the turning, drilling and counterboring operations. It should be a smooth working fit in the body, and the cross-hole should line up accurately with the main passage when full open. To ensure this, it can be marked out in position and drilled from both sides; reaming can be done in position, but beware of forming burrs, which may cause unsightly scoring of the body seating on removal.

In the machining of the jet body, the highest speed of which the lathe is capable should be used, to facilitate deep drilling, as it is important that the centre hole should be true. Turn and drill the top end first and cut the thread, then make an internally screwed chucking piece to hold it for dealing with the other end. To avoid the need for deep drilling of the jet orifice, which must necessarily be very small (exact size is not critical, as it is adjusted by the needle) a somewhat larger hole, say No 60, may be entered to within about $\frac{1}{16}$ in. of the top of the orifice, and followed by the more delicate drill for the rest of the way.

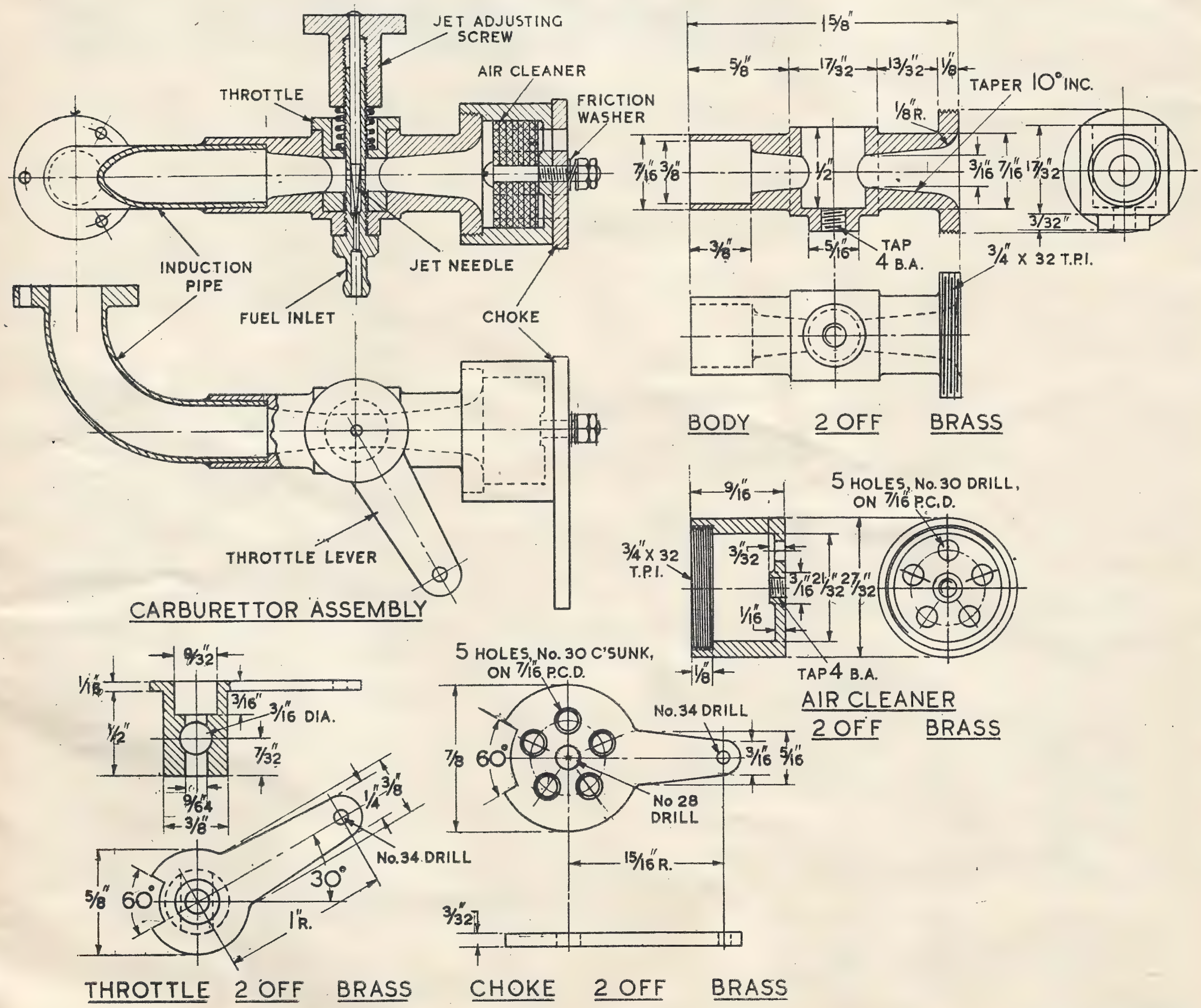
It is desirable to use a hard material such as bronze or German silver for the jet needle. Steel, other than stainless, is not suitable in a four-stroke engine where the fuel is used " neat," as there is a risk of corrosion. The taper can be filed, by running it in the lathe with the end resting in a groove in a piece of wood held in the toolpost; the needle and the wood are filed away together, and a superfine pivot file used for finishing. After making the internally screwed knurled head, the needle is inserted in the jet tube, pushed fully home, and the head screwed on to compress the throttle friction spring. The needle is then soldered in, using either a large, adequately heated copper bit, or preferably, a small blowpipe, so as to be sure that the solder penetrates properly, and does not just form a blob on the outside; after which the needle can be cut off flush, or nearly so. It is a good policy to mark the face of the needle with graduations to show the amount of jet opening, or at least with a single mark to indicate the closed position.

**Clean air**

The air cleaner is an optional fitting, but is desirable, to say the least, in an engine which may have to work on a locomotive, where grit is liable to be thrown up from the track. It is, however, necessary to avoid a tightly-packed filter medium which may obstruct air flow; discs of fine copper gauze, built into a pack, will be satisfactory. Steel wool is effective, so long as it is confined between gauze, so that shreds of it cannot become detached and get drawn into the engine.

Machining of the air cleaner can be carried out all at one setting, including the screwcutting of the internal thread to attach it to the body. The outer end, after facing, has a central hole drilled and tapped for the pivot screw of the choke plate, which is made of sheet brass, and drilled with five holes, slightly countersunk on the outside. Holes to coincide with these are drilled in the end face of the air cleaner. A spring washer on the pivot screw keeps the choke plate in frictional contact with the cleaner; the screw, inserted from the inside, also holds the filter medium in position, and locknuts on the outside are used to adjust the pressure on the choke plate. Both the latter and the throttle plug flange have a part of the edge cut away, and their movement is limited by a pin fitted in the stationary component in each case.

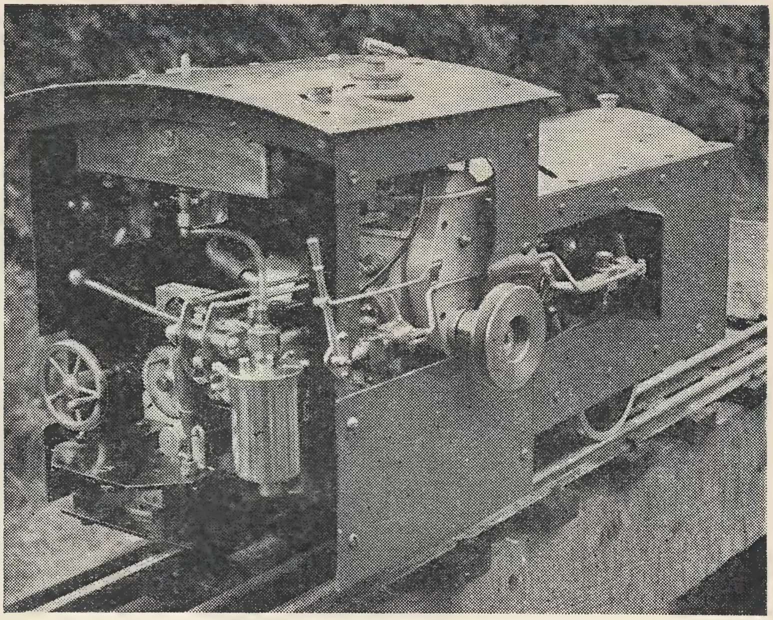
To bend the induction pipes to the small radius specified, it will be necessary to anneal them, and fill them with lead or other suitable solid



material. A grooved pulley of appropriate size will be useful for the bending operation, in the absence of any more elaborate bending appliance. The bolting flanges should be made a press fit on the ends of the pipes, and set squarely before silver-soldering.

### Synchronising

When the engine is assembled, the throttle levers of the two carburettors are coupled by the control rod, and adjusted so that the amount of opening is equal in each case. Jet settings will, of course, have to be individually adjusted, but their positions should be checked and noted, so that readjustment can easily be made after alteration or dismantling. It should not be necessary to use the jet screws for running adjustment; if mixture strength varies with throttle opening, the intake side of the throttle plug should be carefully cut away to correct it. This adjustment can only be made by trial and error, as individual engines vary so much in their requirements that it is impossible to give any definite instructions on the matter. Some of the engines I have fitted with similar carburettors have not nedded any "fancy work" on the carburettor to obtain a full range of throttle control, while others have called for a good deal of patient work on the throttle barrel.

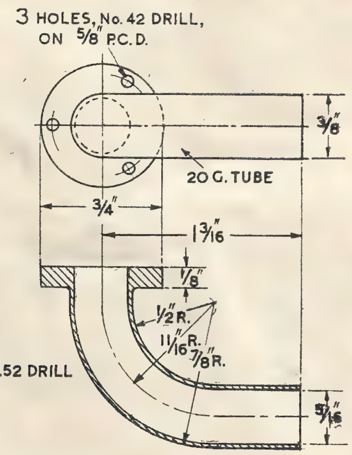


*The 5 in. gauge 0-4-0 locomotive with engine installed showing the lubricator sight-feed, float chamber, friction gear handwheel, and other controls*

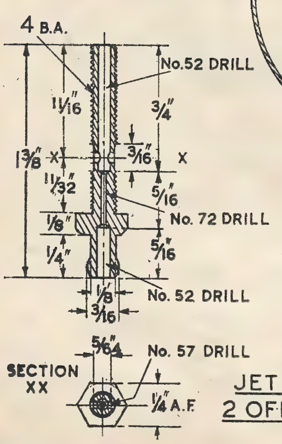
Lubrication of the engine is on the "total loss" system, the oil being fed in gradually by any convenient means, such as a sight-drip-feed; this has proved quite satisfactory in Mr Harris's locomotive, but it does depend on the attention of the driver, and my preference would be a completely automatic method of feeding, for an engine which may have to run for long periods, in the hands of different drivers.

### Out of the rut

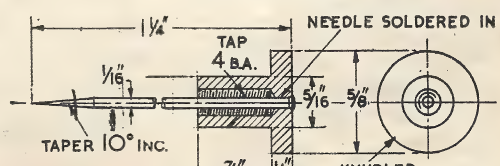
This account of an interesting engine, having many individual features, both in design and constructional methods, will, I trust, provide a welcome change from the more conventional types of i.c. engines which have often been described in ME at various times. Many readers consider these engines stereotyped and uninteresting, but I can assure them that they give just as much scope for variety and originality as any other type of model. Whether the engine is intended to drive a locomotive, or for some other purpose, the flat twin type has many points in its favour, not the least being its excellent balance, which promotes smooth running and flexible control. ▣




INDUCTION PIPE
2 OFF BRASS




JET TUBE
2 OFF BRASS




JET SCREW & NEEDLE 2 OFF BRASS

# Cutting keyways in bores

By GEOMETER

TECHNICALLY, a key is much better than a grubscrew or cross-pin for securing a flywheel, pulley, gear or sprocket to a shaft, which is why it is always employed in full size practice. Its considerable length offers greater resistance to shearing against torque than does a grubscrew or cross-pin of limited diameter. This is not to say that these alternative means are not satisfactory within their capacity, particularly in small sizes where conditions are easier and where it is unnecessary to adhere precisely to detail or typical representational features.

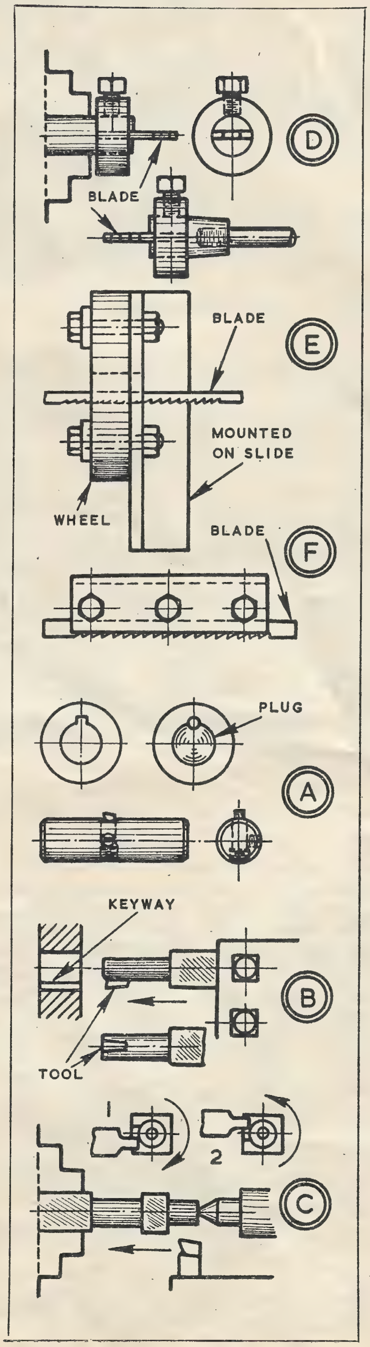
Obviously, for a simple model, a grubscrew or cross-pin may be quite efficient and admissible for securing a component to a shaft; equally obviously, for a large model or piece of equipment, for a scale model, or for a model which merely represents good general practice, a key is essential.

### Methods of cutting

In many cases, cutting the keyway in the bore of the part to fit on the shaft presents the practical problem—especially when the bore is so small that means which are possible in larger sizes cannot be employed.

In large sizes, keyway cutting in a bore can be a shaping operation, using a long tool through the component, or a broaching operation if components are numerous. As a hand operation, it can be performed in certain cases by hacksawing, filing and chiselling, the final sizing of the keyway being done with a tool in a mandrel or drift which is driven through the bore.

In small sizes, when handsawing, filing and chiselling either cannot be employed or would be likely to lead to errors, drilling can be substituted as the roughing operation, with finishing done as before with a tool in a mandrel. A well-fitting plug of the same material should be fitted in the bore of the component, then a hole of suitable size can be drilled, as at *A*. With the component in an independent chuck, the jaws can be manipulated for off-set then the centring and drilling done from the tailstock. Alternatively, the drilling can be done on the table of a drilling machine. Adjustment for the finishing tool in the mandrel can be provided through a backing screw in sizes which admit of it. Otherwise, the tool must be carefully tapped out for each of the three or four passes that are made—and each time the holding grubscrew securely retightened.




### Cutting in the lathe

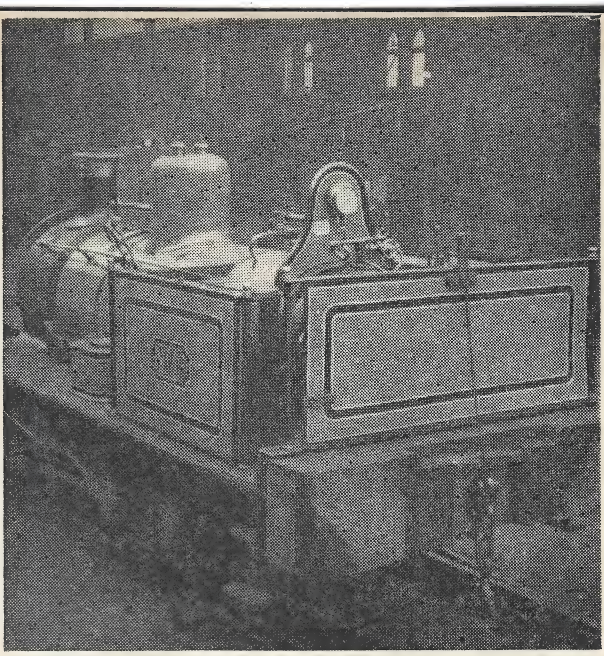
Keyway cutting in the lathe can be done with a tool as at *B*, made from square silver steel rod. It is mounted on the slide which is reciprocated by saddle feed, cross-feed putting on cut. Often back-gear can be engaged to lock the lathe spindle; or a holding bar can be fitted from a chuck holding screw to the headstock or lathe bed.

Steps in making the planing tool are as at *C*. Held in the four-jaw chuck, the material is faced, centred, and supported from the tailstock. The end is turned down to the size of the shank, and this is machined with right and left-hand tools. Surplus material where the actual cutting tool is to be, can be removed by filing or grinding. Then with a planing tool on the slide, set below centre (1), and above centre (2), the remaining surplus can be "nibbled" away, slowly turning the chuck. Final finishing is done by filing, then the tool hardened and tempered.

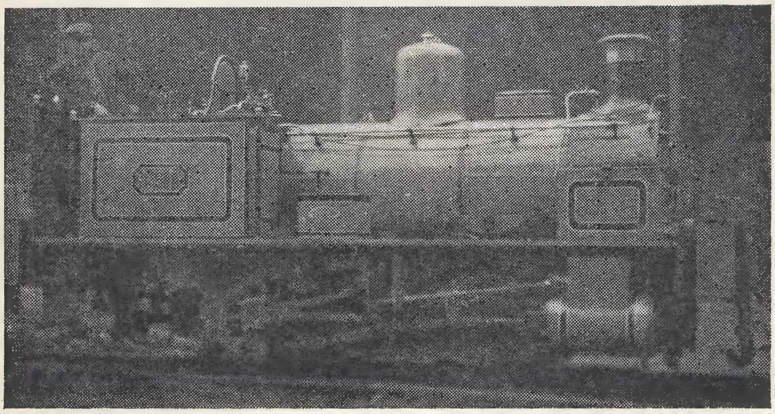
Given a metal-cutting blade, a tiny keyway can be sawn in a bore in the lathe, holding the blade between chuck and tailstock, and mounting the component on angle iron on the slide. Plugs filed half-through, plus half the thickness of the blade, hold it for tightly tensioning with loose pieces and collars, as at *D*—the tailstock plug being secured with a rod and nut. The mounted angle iron can be centred and drilled from the chuck, and a plug used to locate the component for setting up for sawing, as at *E*.

For brass and aluminium components, a blade can be of mild steel strip, case-hardened—during which process it can be clamped between plates, as at *F*, to obviate warping. ■

# GAS WORK'S 30-MILE RAILWAY



Above: *In this view of No 1, the small spectacle plate and its arrangement can be clearly seen, as well as the loose coupling and its release rope*



*Left: Locomotive No 1 seen at Beckton Gas Works. Built in 1870 by Neilsons, of Glasgow*

BECKTON Gas Works started operating in 1870, and within its confines has developed a railway system of great complexity, little suspected by the many people who use the gas it generates. The present locomotive fleet is 35 strong, comprising 25 orthodox steam locomotives, two fireless engines and eight diesel shunters.

Repair and maintenance work can all be undertaken at the gas works. In fact, facilities are such that locomotives Nos 30 and 31 were actually built at the works—probably a unique achievement for a private company. No 31 was used to haul the directors' coach, and on occasion conveyed royalty. Now, alas, it is scrapped and No 30 is due for scrapping too.

The rail system contains about 30 miles of standard gauge track, all contained within 300 acres; a high level and a low level system are in use. This system required five signalboxes until just recently when two were shut down. The steepest gradient between rail systems is 1 in 27, and this requires rush tactics to negotiate successfully with a full load of wagons.

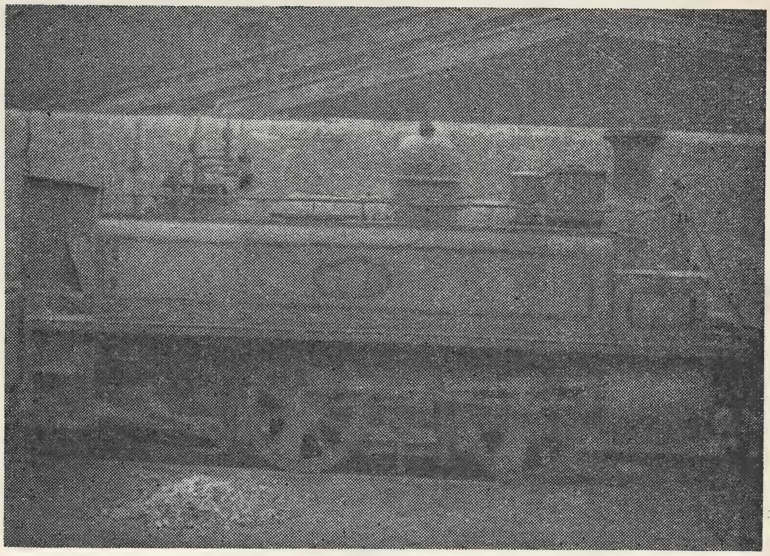
The two fireless locomotives, which are necessary for working in the inflammable coal products area, are looked on with considerable favour, and generally do a day's work on two charges of steam, administered at 300 p.s.i. from a ring main round the works. There is the disadvantage that the work involves constant stops and starts, consequently a steam brake would rapidly exhaust the accumulator. For this reason only a hand brake with its attendant difficulties is fitted.

A great variety of wagons, 735 in number, is in daily use. They include hopper bottom wagons with vacuum-operated doors. For this reason several of the locomotives are fitted with Westinghouse pumps. The track is of 45 lb flat bottom section spiked directly to the sleepers. Wastage of rails is heavy in the chemically laden atmosphere.

Certainly the most interesting of the locomotives to be seen at Beckton is No. 1, an 0-4-0T built by Neilsons, of Glasgow in 1870. Locomotive building in that year must have been at a high peak of efficiency, and pride in appearance for brass handrails, pipework and chimney cap serve to set off a powerful little locomotive, which has given a good measure in 90 years' service, and is still in steam.

One feature is common to nearly all Beckton locomotives, they have overall dimensions small enough to

**The Beckton Gas Works railway system has been in operation for 90 years. In this article by K. R. NORTHGREAVES, an account is given of some of the locomotives which are employed**



*Soon due to be scrapped, locomotive No 30 was built at the gas works*

permit them to work through the retort houses, which have small entrances by locomotive standards. No 1 is 8 ft 2 in. tall and 7 ft 3 in. wide. Its overall length is 17 ft 4 in. The spectacle plate accommodates a steam pressure gauge, showing a red line at 120 p.s.i. (None of the locomotives is superheated.) With a wheel base of 5 ft and of 2 ft 9 in. wheel diameter, No 1 is able to negotiate curves as small as 45 ft radius.

The scale equivalent in $3\frac{1}{2}$ in. gauge would be about 3 ft radius, and would enable a scale model to operate in the smallest garden. Twin outside cylinders of 10 in. bore × 18 in. stroke provide a tractive effort of 5,570 lb and operate through Stephenson valve gear mounted outside the wheels, an arrangement rarely seen. Most of the working day is spent in short haul work, and it is rarely possible to notch up the valve gear for expansive working. The locomotive with 280 gallons of water, weighs 15.92 tons, the grate area is 34 sq. ft and evaporative surface 319 sq. ft. A single steam injector and steam brakes are fitted.

Today, No 1, nearly 90 years old, strikingly painted in apple green, lined out in black with white borders and with red motion work, gives every appearance of completing its century without effort. A testimony to rugged construction and good maintenance. ▣

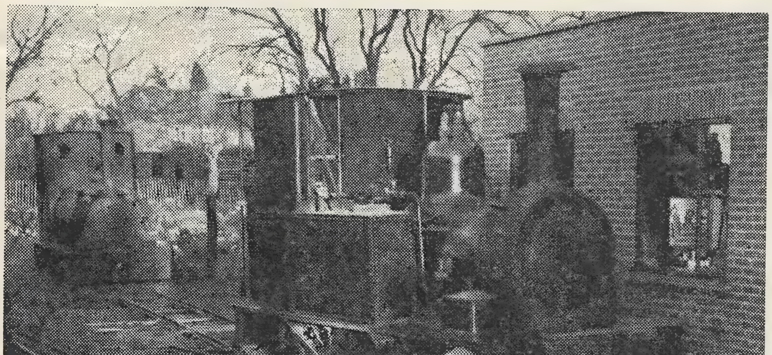
## Industrial engines preserved

WITH the co-operation of the Dorking Lime Co. Ltd, Betchworth, I managed to secure for preservation one of their 3 ft 2 in. gauge steam locomotives.

The locomotive is *William Finlay* 0-4-0T built by Fletcher, Jennings and Co., of Whitehaven in 1880. The maker's number is 173 and she was supplied new to Betchworth and used with her sister engine *Townsend Hook*, to bring chalk from the quarry on the side of Box Hill to the works. The locomotives had been in regular use until about two years ago. *William Finlay* is named after the founder of the works who was an engineer on the construction of the Manchester Sheffield and Lincolnshire Railways. Its cylinders are 8 in. × 16 in., and the driving wheels are 2 ft 4 in. diameter.

The locomotive has been little altered in its 80 years of life. As built it had no cab but a cab of the present design is believed to have been added. Originally the locomotive had Salter spring balance type safety valves on the dome but it lost these probably when reboiled in 1922. The mechanical lubricator and the present injectors are also recent additions.

The locomotive is understood to be in working order and it is hoped it will again run in the grounds of my home—which is already graced by a Peckett 0-6-0ST *Triassic*.—J. B. LATHAM.



## NEWS REPORTS—1

# Birmingham Museum stages traction engine rally

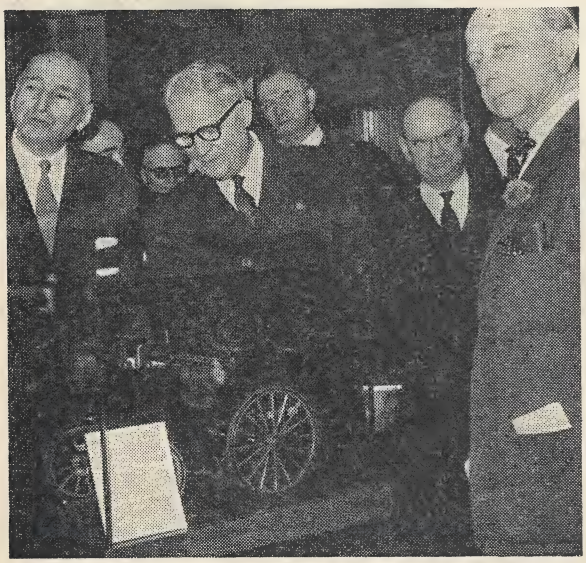
**Midlands fans were attracted to this novel meeting in the centre of a city. Some of the vehicles are described here by W. J. HUGHES**


*Once fitted with smokebox superheater, Garrett No* 29764 *was new in* 1911

A LARGE crowd of enthusiasts recently saw several road steamers assembled outside the Birmingham Science Museum, a further illustration of the go-ahead policy and lively minds of the authorities who govern that excellent institution. Some of the engines and their personnel were old friends, among them being *Winston Churchill*, Burrell showman's engine No 3909, and her owner Eric Middleton. The latter has recently achieved a long-held ambition by managing to acquire for her a full-size dynamo with separate exciter, instead of the

## NEWS REPORTS—2

# *Few working models at Paris Exhibition*



*Admiring the finer points of the model of a Panhard motor-car at the Model Cars International Exhibition*

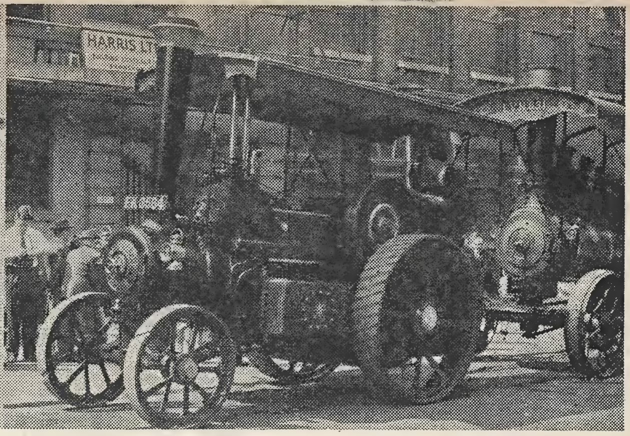
SOME 3,000 models were shown at the Model Cars International Exhibition, held in Paris, among them being examples of the earliest vehicles in the field.

It was noticeable that most of the models exhibited originated from international firms of toymakers. However beautiful these models were, they did not compare with the accomplishments of authentic model makers.

On the amateur side it was a pleasure to see the work of M. Michel Conti (Torino) exhibiting a 2 litre 5 Ferrari, Mr Olive Sans (Barcelona) with a 125 c.c. Montesa motorcycle, M. Eugèn Ziegler (Stuttgart) who showed two Mercedes lorries, the mechanical parts of which were very well displayed.

Among the French exhibitors there was a model of a car as invented by Serpollet. It was very neatly constructed by Mr Brochet. Next to it was an old Ford T model by Mr Libmann, a replica of the De Dion Pekin-Paris by Mr Antonietti, the Symington steam car by Mr Angilven and many other models that brought to mind the history of the automobile.

For the amateur used to the Model Engineer Exhibition, this show gave the impression of an exhibition of decorative models rather than of working models as, apart from the small group of those who build working models with cylinder capacities of 1 to 10 c.c., there were hardly any mechanical examples at all. ▣



*Left: Foden tractor* MATILDA, *No* 11780 *now owned by Mr E. Middleton. Right: Burrell gold medal tractor No* 4084, *built in* 1927 *and now in the possession of Mr Frank Holl. The man on the footplate in this picture is Mr A. J. Kent*

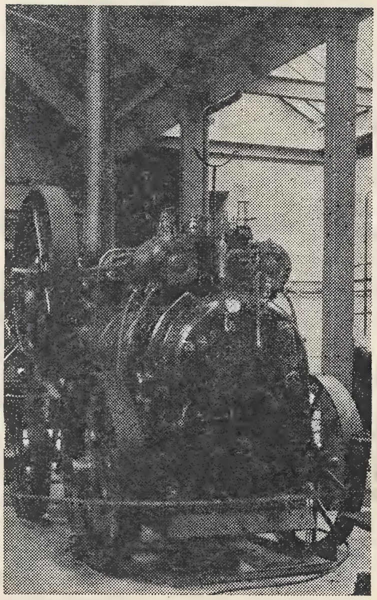
smaller dynamo which was fitted on the front platform only. Thus she returns to her correct dignity as a scenic engine, with her generating power restored in full.

The Foden tractor No 11788 *Matilda* is also owned by Eric Middleton. She was under the control of Arthur Wedgwood, who is a mine of knowledge on steam traction in general and on steam wagons in particular, especially Fodens. He has driven *Matilda* many hundreds of miles, including the run up to the Foden centenary in 1956.

Then there was Frank Holl's Burrell tractor, No 4084, which was the last of the "Gold Medal" tractors to be built. This was in 1927, since when she has served well and faithfully, though she is now in semi-retirement. On this occasion she was temporarily in charge of A. J. Kent, of the well-known Kent and Tapper partnership, winners of so many high awards at successive Model Engineer Exhibitions. A number of their magnificent models were, of course, to be seen inside the museum itself, where they are on indefinite loan.

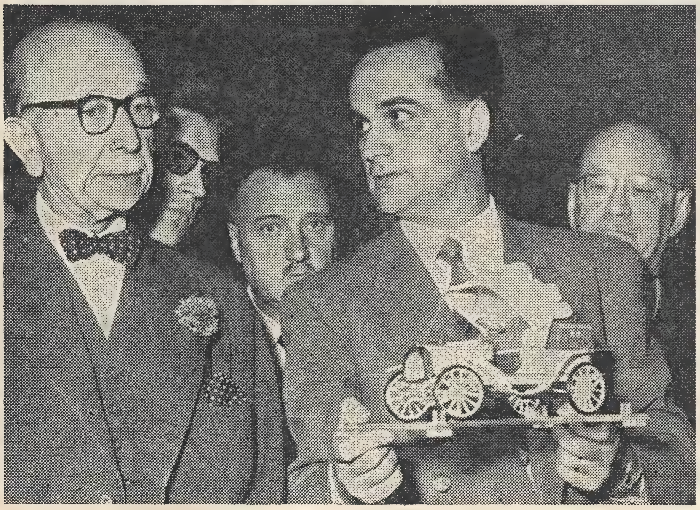
The biggest engine present was the Fowler Super Lion (10 n.h.p.) *Duke of York* No 17106, a crane-equipped road locomotive which, among several feats, mentioned in my book *A Century of Traction Engines*, on one occasion lifted a 17-ton boring mill, and on another pulled bodily sideways a 100-ton Scammell loaded with an 80-ton girder. Some engine! She is now owned, and regularly used, by the firm of A. James and Sons, of Kingswinford, Staffs.

Owned by A. D. Smith, of Oldburrow, the Burrell 5 n.h.p. showman's engine *Nero*, No 3669, was originally the property of the Bostock and Wombwell establishment, and was actually named after one of their lions. New in 1915, she is spring-mounted and has three speeds, being



*This Ruston Proctor* 14 *h.p. portable was one of the exhibits in Birmingham Science Museum during the rally*

## G. M. SUZOR writes about a show of amateurs and professionals

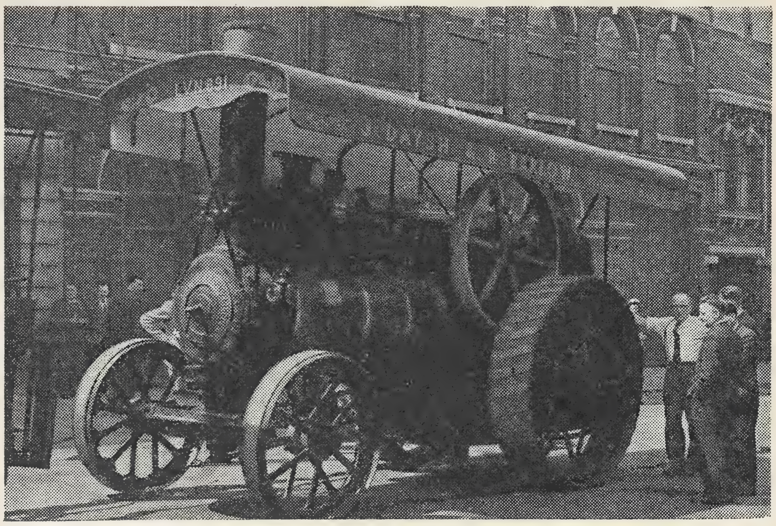


*Count H. de Liedekerke Beaufort, president of the French Automobile Club is shown a model of the De Dion Pekin-Paris by M. Antonietti, its maker. It was seen at the Model Cars exhibition*

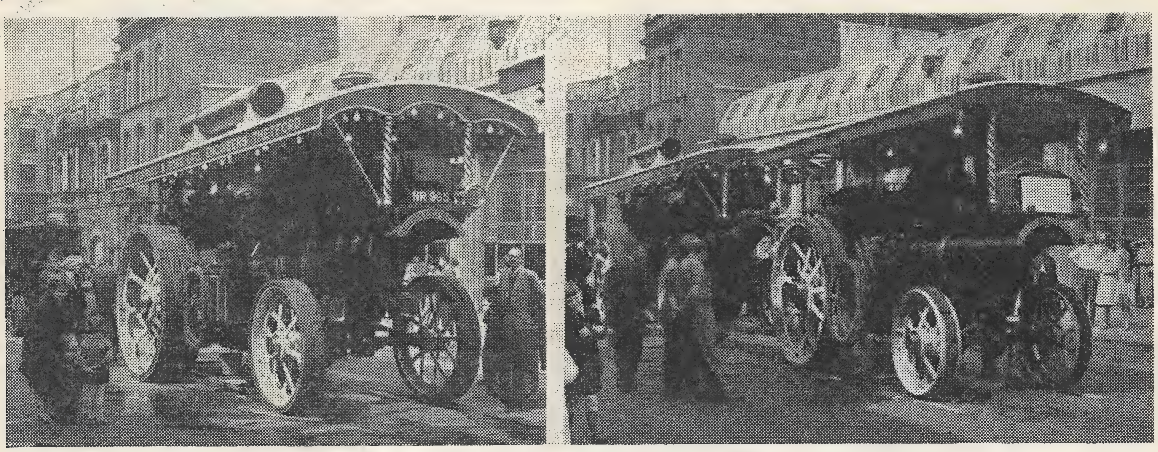
in fact a full road locomotive in spite of her comparatively small size.

Other traction engines present were Foster No 14418, a 7 n.h.p. general purpose engine new in 1920, and Garrett No 29764 which was new in 1911. The former is now owned by J. Daysh and R. Barlow, and the latter by F. C. Lambe. Originally fitted with a smokebox superheater, the Garrett has a piston valve to her single-cylinder. The superheater and its ugly square-topped smokebox were removed some time ago.

Inside the museum there were several engines in steam, including the Aveling and Porter steam roller, the Ruston Proctor double-cylindered portable of 14 n.h.p., the Galloway drop-valve horizontal engine, and the Amos compound beam engine of 1864. A new exhibit since my last visit was a grasshopper engine built by Robert Stephenson's at Newcastle in 1823; it was not under steam, but who knows, perhaps some time in the future it may be. ▣



*Foster 7 h.p. No* 14418, *new in* 1920, *now owned by Mr J. Daysh and Mr R. Barlow*

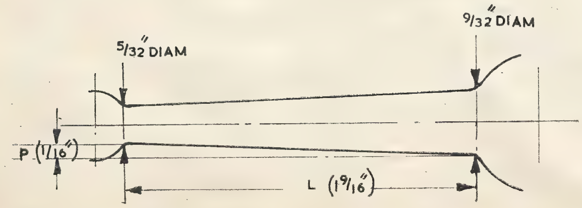



*Left: Burrell scenic showman's engine* WINSTON CHURCHILL, *No* 3909, *owned by Mr E. Middleton, of Hartlebury. Right: Another Burrell showman's engine No* 3669, *built in* 1915. *A* 5 *h.p. vehicle, she is the property of Mr A. D. Smith, of Oldbarrow*

---

# Formula for taper setting

## By R. JOHNSTON




Many occasions arise in lathe work which necessitate the turning of a taper. It is useful to apply the correct procedure to find angle setting, which is much more practical than finding the angle by test cuts.

A typical piece of work is a connecting-rod, as shown in the sketch. With the three sizes given, the rule is simple. Let $L$ represent length and $P$ perpendicular.

$$P \div L$$
$$= \tfrac{1}{16}\text{ in.} \div 1\tfrac{9}{16}\text{ in.}$$

Convert dimensions to fractions of common values, i.e. eighths and sixteenths. In the present case the conversion is to sixteenths and a decimal division becomes:

$$\begin{array}{r} 0.04 \\ = 25\ \overline{)1.00} \\ 1.00 \\ \hline 0.00 \end{array}$$

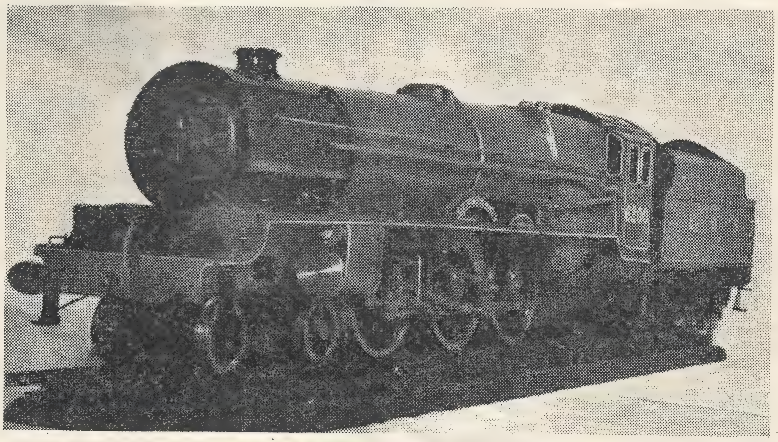
Now look up the table of natural tangents and find the nearest comparable degrees and minutes to 0.04 as required. It will be found that angle setting is 2 deg. 20 minutes. ▣

My track is a 250 ft steel oval with concrete blocks below. It is in 3½ in. gauge and has a rise and fall of 1 in 120 and level section for about 50 ft. The outer rail is banked all the way round to ½ in. above the inner. This amount I found was necessary because of the small radius—25 ft, and it proved to be quite comfortable and safe at high speeds.

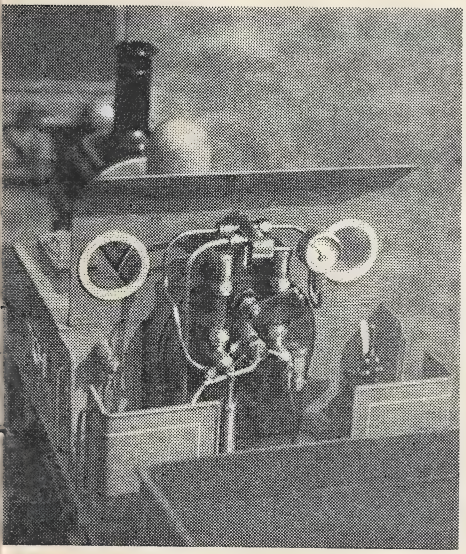
There are one or two objections to the steel rail. First among these is the noise it creates and second, the amount of drag between the wheel flanges and rail due to rust. The amount of rust brought about in winter can make a difference of two adult passengers in hauling capacity. I make a habit of going round the track with a rough file each year before starting to run. The advantage of using steel rail is its ability to grip at starting. I think the best layout would be steel "bullhead" rail, a little over scale size to give a wider line contact and laid on sleepers. The rust problem is less troublesome now, since one can acquire prime-etch liquids.

# DOES RUST AFFECT HAULING CAPACITY ?

*V. BEESWICK, of Manchester, puts it at two adults*



*This fully detailed model of* PRINCESS ROYAL *in 3½ in. gauge took 10 years to construct and won the second prize at the Northern Models Exhibition*



*The modified version of* TICH *which was made partly as a diversion from the construction of* PRINCESS ROYAL

My first engine, finished in 1939, was a 3½ in. gauge Atlantic *Maisie.* It has covered over 1,000 miles with only one strip down. I found one piston to be minus three thou, the eccentric straps were all egg-shape to plus ten thou, but the remaining parts were not bad enough to warrant repairs. The boiler is a good steamer for about three hours, after which it is necessary to clean the bottom row of tubes.

I prefer larger bore firetubes than those normally specified, because a less and softer draft can be applied which in turn increases the pleasure derived from those fascinating exhaust beats. I have built several boilers, small and large, wide and narrow type fireboxes, with small and large bore tubes. I preferred the large tube boiler, not because they steam faster, but because they maintain the initial output over longer periods.

Another of my models, *Tich,* was built as a relaxation from the long spell in producing an earlier engine. This was a fully detailed 3½ in. gauge *Princess Royal* which won second prize at the Northern Models Exhibition, and took 10 years of spare time work.

*Tich* was built to the drawings with a few additional details such as two water gauges, chequer plate and a coal and water tender. ▣


How to build a model of one of the most modern tugs now on the river Thames is described in this series by OLIVER SMITH

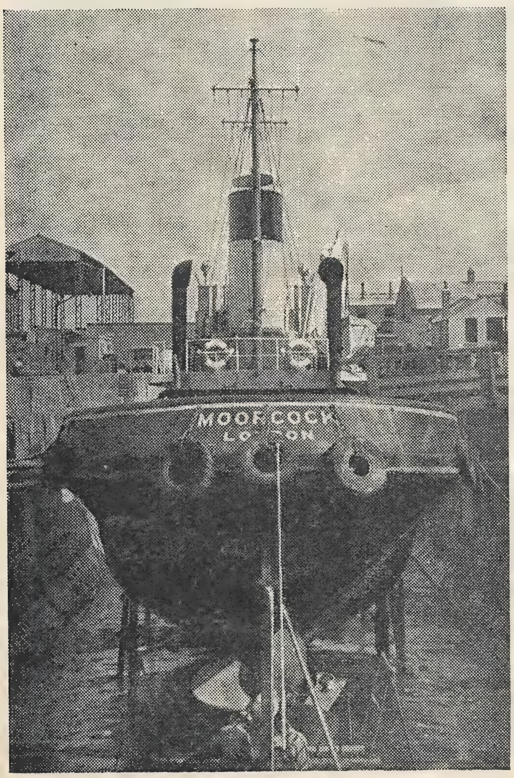
*Continued from 9 June, 1960, pages 698 to 699*

# A powerful ship towing and salvage vessel with a fine hull

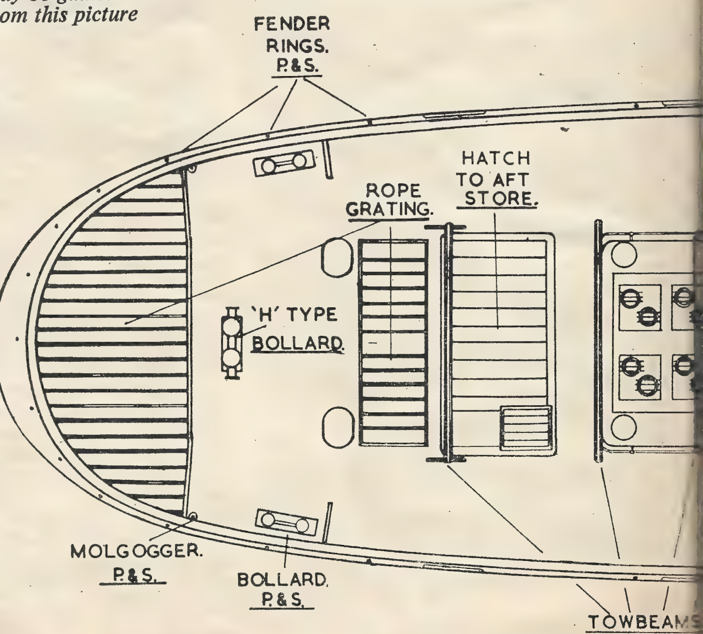
THE *Moorcock*, a vessel of 273 tons gross, is one of the most powerful tugs of its type operating on the Thames. It was designed and built by Richard Dunston Ltd, of Thorne, Yorkshire and was placed into service by its owners, Gamecock Tugs Ltd, London in the latter part of 1959. Many modern ideas in design and layout are incorporated in this tug including up-to-date mechanical and electrical equipment, the latest towage and salvage gear, and particular care has been taken to provide the crew of nine with a high standard of accommodation and amenities.

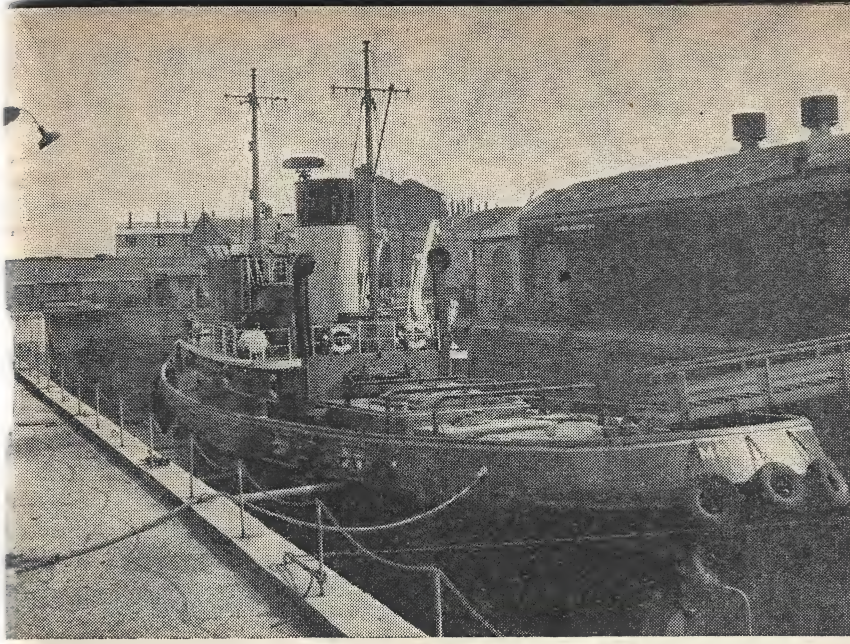
The hull is worthy of special mention because it is claimed to be the finest of its kind ever to be put into the water. The hull lines have been perfected to such a degree that they are kept secret by the designers. This is understandable when it is realised that they embody years of operational experience combined with knowledge gained from trials and experiments with models in the water tank. Her principal dimensions are 105 ft overall length, 28 ft 3 in. width moulded and 14 ft 6 in. depth moulded.

Power for the *Moorcock* is supplied by an eight-cylinder in-line Polar two-stroke compression ignition engine. This is a slow speed type of engine developing 1,600 b.h.p. at its maximum of 300 r.p.m. It drives directly on to the propeller shaft to the four-bladed propeller which is of fixed pitch. There is no gearbox of any kind and to reverse the rotation of the propellers the Polar engine is set to run in the opposite direction. Readers who are not familiar with the workings of an internal combustion engine or to those having just an elementary knowledge, this may sound complicated, if not drastic. In fact it is a simple operation.



*Left: Some idea of the size of the four-bladed fixed pitch propeller and the shape of the rudder may be gained from this picture*





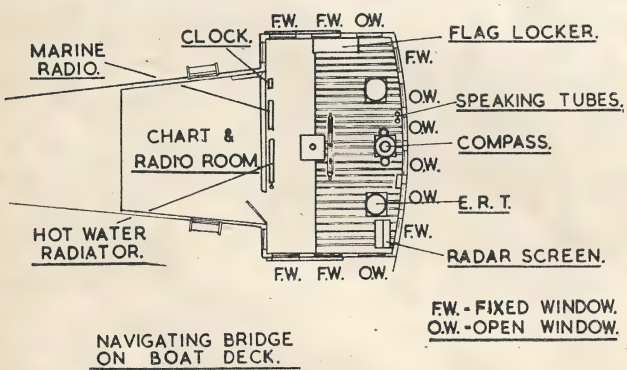
*Deck details and superstructure of the m.t.* MOORCOCK, *seen from the stern*

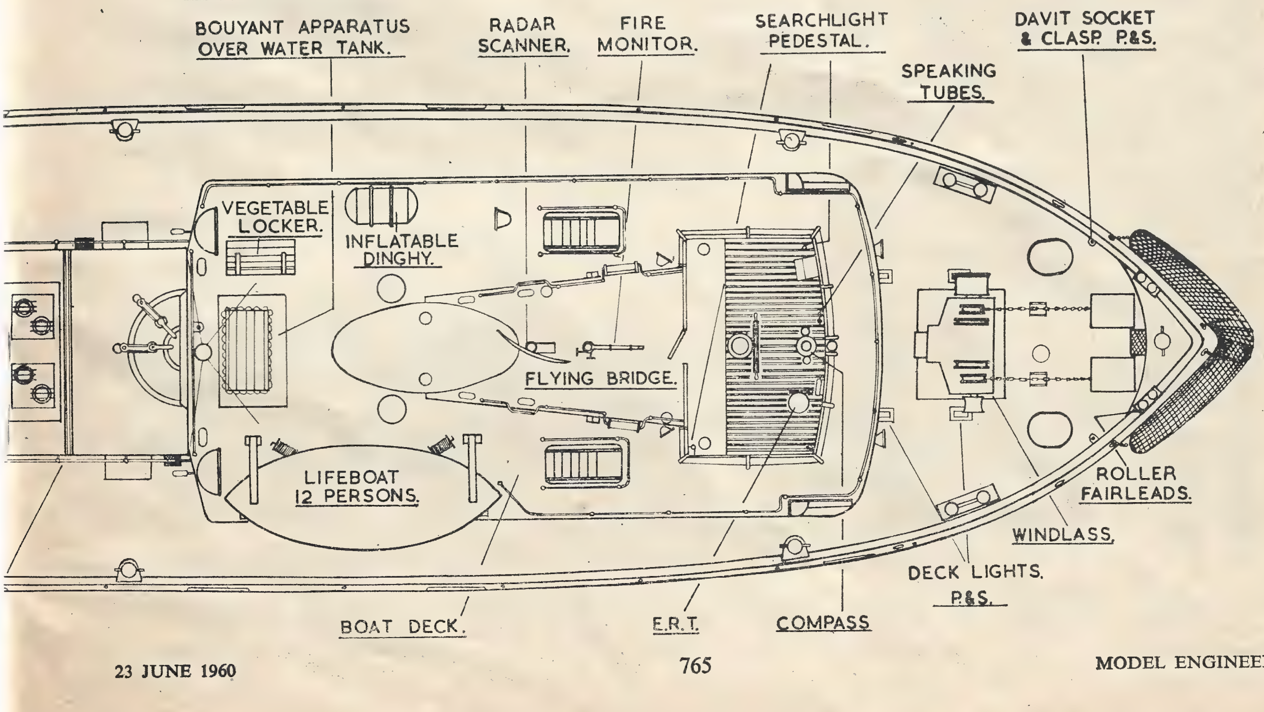
The only change required to the operating cycle of the engine is to reset the timing for the fuel injection pumps and the compressed air starting valves. To do this the engineer moves a lever in a frame, marked "*Forward*" and "*Astern*," attached to the fuel injection cambox on the side of the engine. When the lever is moved from one position to the other it brings into action the set of cams required to operate the fuel injector pump and air starting valves. A separate lever is provided to govern the amount of fuel to the cylinders and, of course, the speed of the engine. In the first instalment of this series [ME, June 9] I showed chief engineer Mr Alfred Dunlop at the controls of a Polar engine. The picture included the two levers mentioned above.

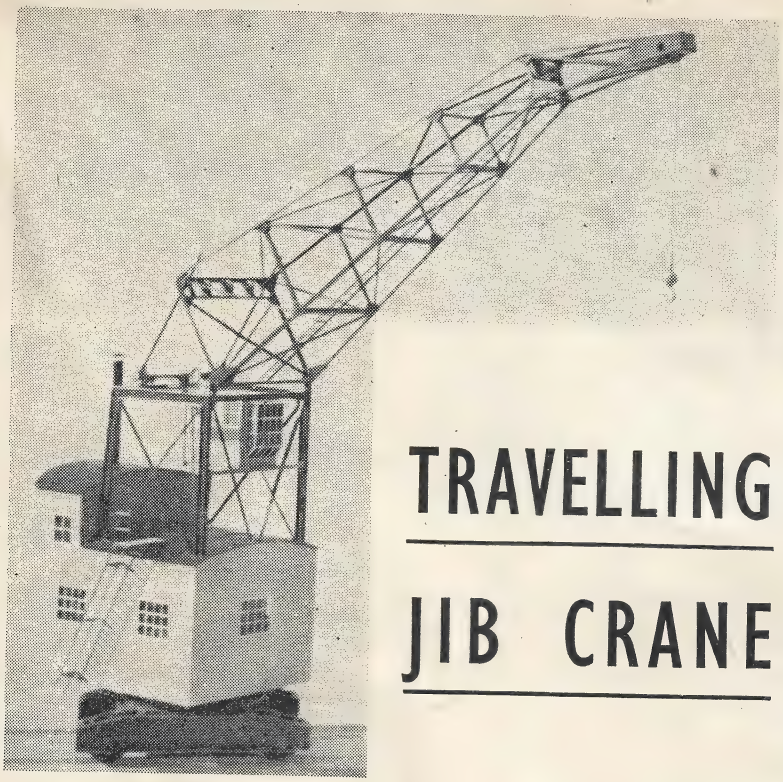
The *Moorcock* has all the latest aids for navigation including radar, radio-telephony and VHF. Her steering mechanism is operated by the electric hydraulic system, and her lifeboat for 12 persons is built from fibreglass.

Before closing these introductory remarks, I would like to explain that from time to time I shall mention the m.t. *Dhulia* and show pictures taken on board her to illustrate points under discussion. The m.t. *Dhulia* is exactly the same type of vessel, built at the same time and by the same company as the *Moorcock*. She also came into service at the same time but is owned by William Watkins Ltd, of London.

★ *To be continued on July 7*





*Front view of the travelling crane, with the crane house turned 45 deg.*

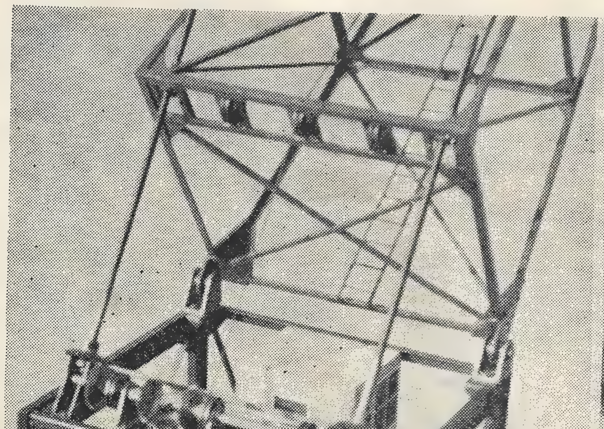
# TRAVELLING JIB CRANE

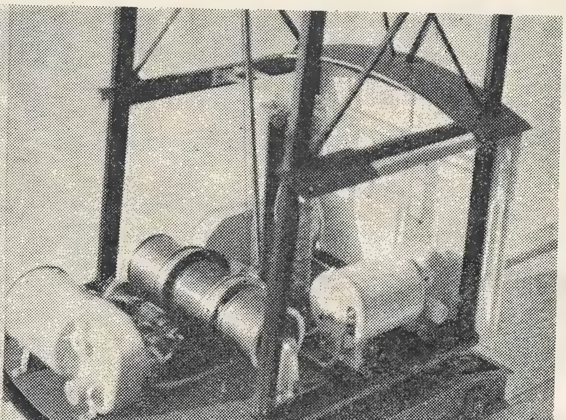
**By J. V. M. HARPERINK**

THIS model of the travelling jib crane was built by Mr S. J. van Kampen, of Delft, Holland. Its prototype can still be seen working in the harbour of Rotterdam for the transhipment of coal and ore, travelling on rails fitted to the deck of a pontoon. The pontoon is moored alongside the ship to be unloaded and as the crane can travel to and fro on the pontoon, it need not be shifted when on duty, so saving time.

The model, which has steam outline, is electrically driven and built to 1 : 25 scale. The height of the top disc above rail level is 40 in., the jib being in its average position. The rail is about $6\frac{1}{4}$ in.

The undercarriage is built up from steel sheet, the jib and upper structure from *L* and *U* brass, riveted and soldered. The crane house is from wood as in the prototype, the chimney being a dummy. The various movements, viz: as a derrick, hoisting, slewing and travelling are by 12 v. CAV electric windscreen wiper motors. These motors are of the shunt type. By switching over the connections of the motor, the poles of the armature change, and the motor can be reversed. The motor for the travelling movement is a Bosch windscreen wiper motor. All motors were salvaged from a motorcar breakdown yard. The



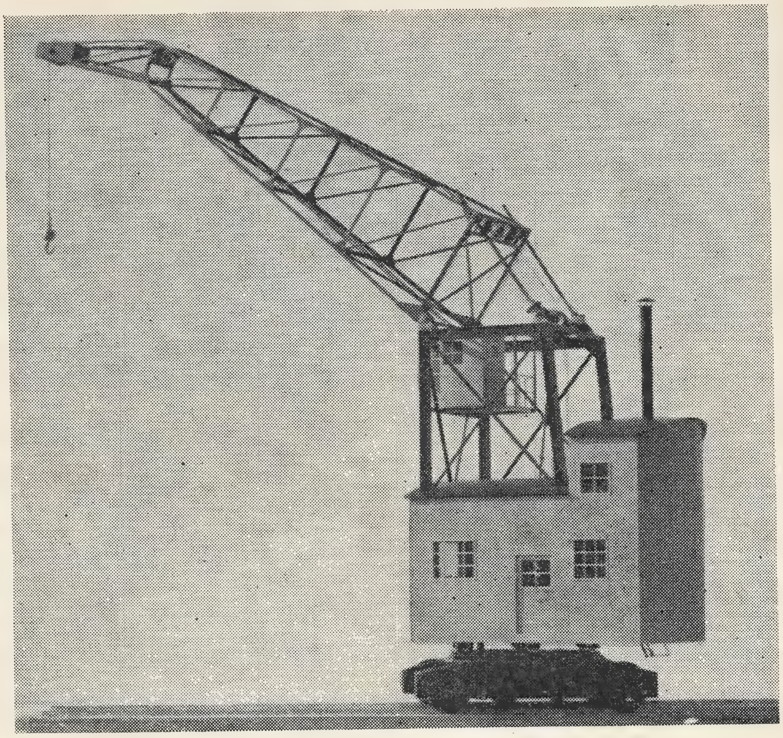


*Left: Details of the upper structure showing gears and pivots of the derrick construction, stairs and hanging cabin of the crane driver. Right: Details of the winding drums. Three walls of the cabin have been removed for clarification*

rollers under the cabin for the slewing motion run on an old oil-engine piston ring, the slot being welded.

The motors are remote controlled and the wires go through the hollow pivot. The difficulty of transmitting the current to the turning upper section is solved by means of a Pertinax tube on which brass and Pertinax rings are slipped. The wires were soldered from the interior of the Pertinax tube to the brass rings and sliding contacts transmit the current to the various motors.

There are three winding drums with clutches, two for hoisting and one for opening and closing a bucket. These are not shown in the pictures, but will be added in the future, to take the place of the hook shown. Three hoisting speeds are provided: 6 ft/min., 3 ft/min. and 1½ ft./min., which enable the model to hoist loads of 1, 2 and 4 lb. The only parts not made by the builder are the windscreen wiper motors and the gears, which are Mecanno. ▣



*This view of the travelling jib crane shows the position of the crane house door and the lofty perch of the driver's control cabin. The model can lift up to 4 lb.*

**FOR YOUR BOOKSHELF**

# Rail, river and canal

**A National Waterways Conservancy** (*The Inland Waterways Association Ltd*). 1*s*.

THE constant advocacy of the Inland Waterways Association, since it was founded 14 years ago, has been to urge the development of the river and canal system of Britain. In this they are often greatly misunderstood for it is sometimes mistakenly assumed that the Association merely wants to preserve the waterways as a piece of old world picturesqueness to fascinate overseas visitors or the townsman.

This is not so. The Association is primarily concerned with developing the river and canal system into a lively, modern undertaking ready to exploit its fullest potential and complement—but not necessarily compete with—road and rail traffic. Their aims—and they are far-reaching and comprehensive—are clearly set out in a well-written booklet which may be obtained from the Association's office, 4 Emerald Street, London WC1. It puts forward an original scheme for dealing with Britain's waterways.

It suggests that, in the same way that the River Thames was rescued from oblivion by the forethought and acumen of the Thames Conservancy, which replaced the ineffectual Thames Commission, so could the rivers and canals of this island be resuscitated by a far-sighted group of individuals ready to consider every commercial angle.

The originality of the scheme rests in the composition of the proposed National Waterways Conservancy. It is suggested that interested people and well-wishers should become paying members of the Conservancy with the power to elect half the administrative body, the other half being appointed by interested ministries and societies, of which the booklet tabulates a provisional list of nearly 40.

From a nostalgic viewpoint, I would like to see the canals and rivers of Britain restored to their former attractiveness and if, at the same time, they can be given some commercial significance then I hope the Association's efforts will not be in vain.—L.B.H.

**Unusual Locomotives** *by E. F. Carter.* (*Muller.*) 21*s*.

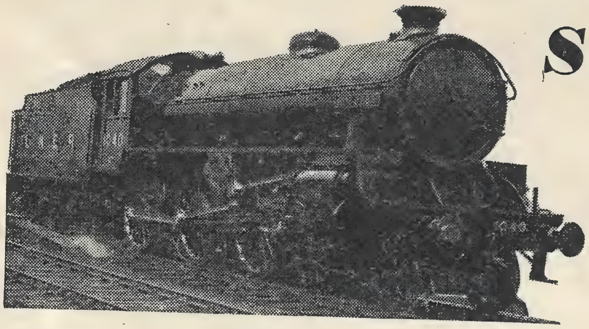
THE first chapters describe the early railway engines in Britain and America, and other chapters deal with the early experiments of Marc Séguin with multi-tubular boilers, and some of the peculiar locomotives which were entered for competition arranged by the Austrian government in 1850.

The idea of having two boilers on the one engine seems to have occurred to several of the early locomotive engineers, and the Flaman designed engines for the French railways enjoyed a moderate success around 1894.

The Shay and Heisler geared locomotives are well known and proved types, but the Paget eight-cylinder experimental locomotive was a clever and bold idea, which was frustrated by higher authority when on the verge of achieving real success.

The steam turbine, of course, was tried in railway locomotives several times and in the case of the LMS Pacific No 6202 with no little success, but due to higher first cost and maintenance difficulties, had to give way in the end to more conventional types.

Mr Carter's book ends with a short review of the world's final steam locomotives and includes useful appendices.—R.M.E.



# SPRINGBOK

## An LNER B1 4-6-0 locomotive in 5 in. gauge, built and described by MARTIN EVANS

*Continued from 9 June, 1960, pages 703 to 705*

**This week's instalment deals with the link brackets, return cranks, lifting arms and eccentric rods of the 5 in. gauge B1 class engine**

HAVING completed the radius rods, it is time to turn to the link brackets, which were illustrated in the June 9 issue. The link brackets, which may look rather formidable at first sight, are built up from five separate pieces, but if tackled systematically, are not at all difficult. The five parts are: (from back to front) a piece of $\frac{1}{8}$ in. thick b.m.s. forming the back or bolting plate, a piece of b.m.s. $1\frac{5}{8}$ in. $\times$ 1 13/32 in. $\times$ $\frac{3}{8}$ in. thick forming the inner extension piece; the inner link frame of $\frac{1}{8}$ in. thick b.m.s., a piece of b.m.s. $1\frac{5}{8}$ in. $\times$ $\frac{3}{4}$ in. $\times$ $\frac{3}{8}$ in. thick forming the outer extension piece, and, finally, the outer link frame of $\frac{1}{8}$ in, material which is held on by four 5 BA countersunk screws.

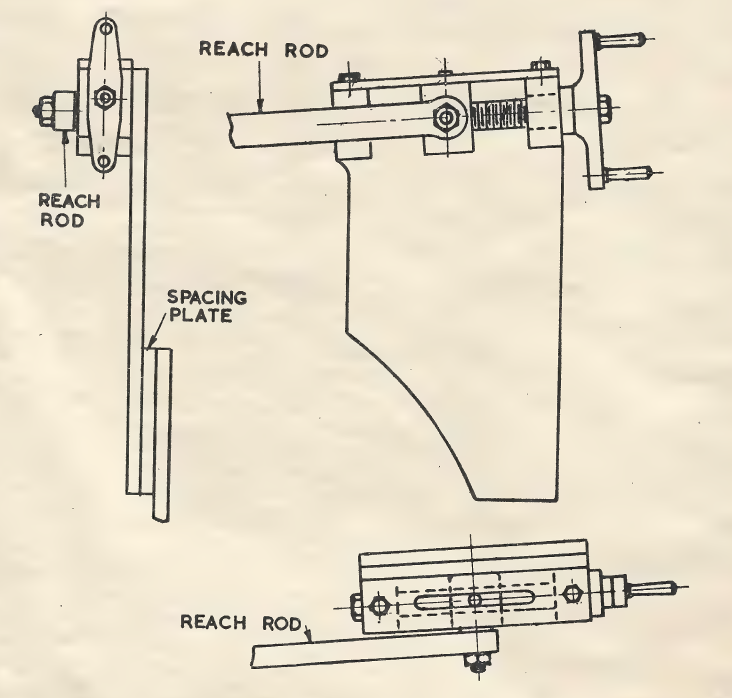
Cut out the three $\frac{1}{8}$ in. thick pieces first, turn and fit the bronze bushes, then cut the two $\frac{3}{8}$ in. thick pieces, a little oversize, putting them in the four-jaw to get the edges really square. Mill out the slots—a short slot $\frac{1}{2}$ in. wide $\times$ $\frac{5}{16}$ in. long to clear the vertical reversing arm, and a long slot $\frac{5}{16}$ in. wide going almost the whole length of the outer extension piece. This, of course, is to give clearance for the radius rod when in full backward gear.

### Assembly of bracket

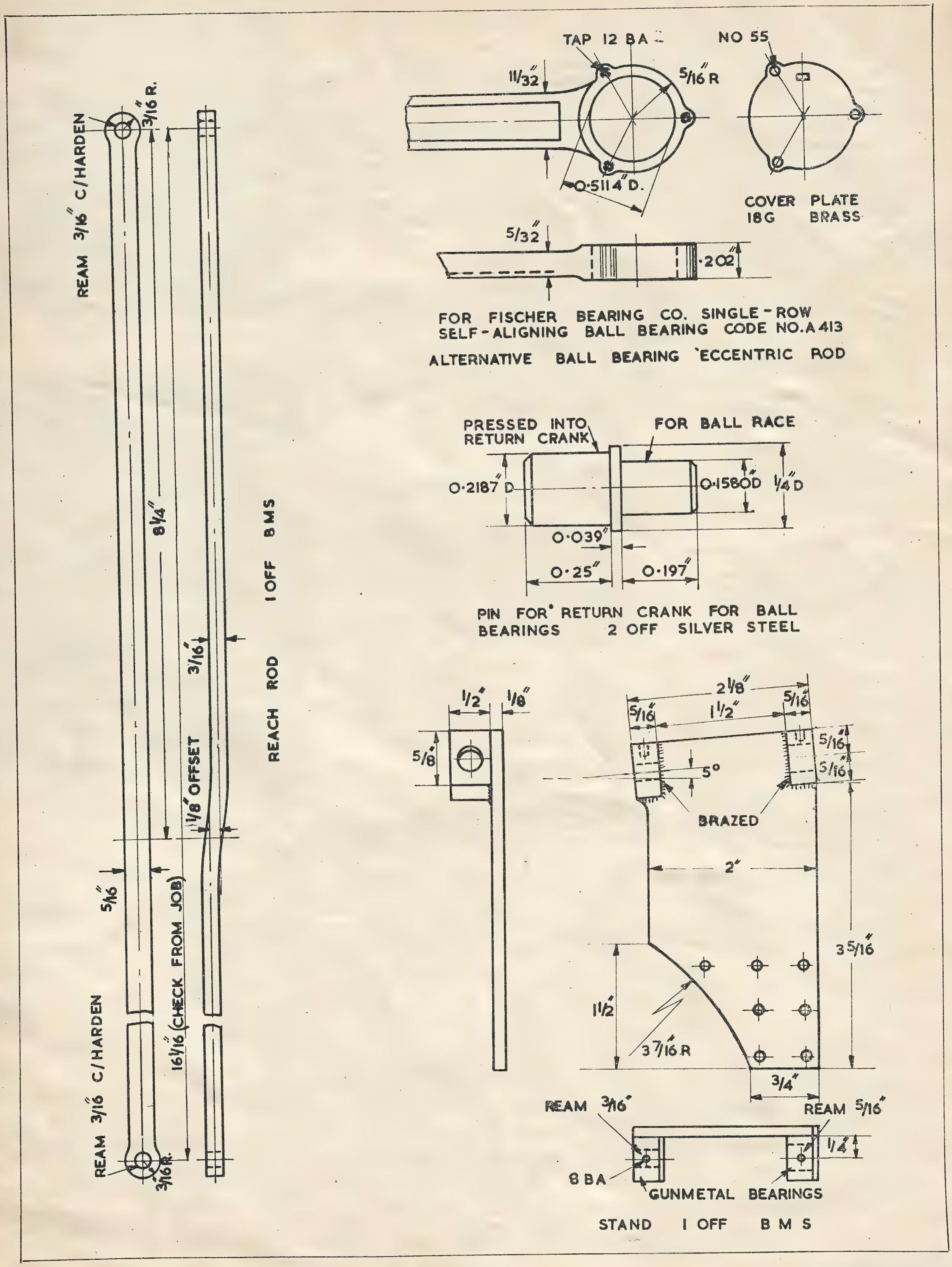
Now screw the backplate on to the inner extension piece using two 6 BA $\times \frac{3}{8}$ in. steel countersunk screws, and screw the inner link frame on its other edge, using similar screws. To hold the outer extension piece to the assembly needs a little more care, as the screws must be at least 1 in. long, and they must "dodge" the positions for the four 5 BAs required to hold on the outer link frame, and also the long radius rod slot. Careful marking out will do the trick.

When the four parts are bolted up nicely in line, they can be brazed in the usual way, forming fillets on the underside.

To line up the outer link frame, use the special "lining-up" holes provided in the mainframes. Actually the lining-up holes are $\frac{3}{16}$ in. dia. (see page 587, ME, 24 December 1959) but these can be quickly opened out to 7/32 in. with a hand-drill and a length of 7/32 in. silver steel inserted right across the frames and through both left-hand and right-hand link



SCREW REVERSING GEAR


REAM 3/16" C/HARDEN
3/16 R.
8 1/4"
3/16"
1/8" OFFSET
5/16
16 11/16" (CHECK FROM JOB)
REAM 3/16" C/HARDEN
3/16 R.
REACH ROD 1 OFF BMS
TAP 12 BA
NO 55
11/32"
5/16" R
0·5114" D.
COVER PLATE
18G BRASS
5/32"
·202"
FOR FISCHER BEARING CO. SINGLE-ROW
SELF-ALIGNING BALL BEARING CODE NO. A 413
ALTERNATIVE BALL BEARING ECCENTRIC ROD
PRESSED INTO RETURN CRANK
FOR BALL RACE
0·2187" D
0·1580 D
1/4" D
0·039"
0·25"
0·197"
PIN FOR RETURN CRANK FOR BALL
BEARINGS 2 OFF SILVER STEEL
1/2"
1/8"
5/8"
2 1/8"
5/16"
1 1/2"
5/16"
5/16"
5/16"
5°
BRAZED
2"
3 5/16"
1 1/2"
3 7/16" R
3/4"
REAM 3/16"
REAM 5/16"
1/4"
8 BA
GUNMETAL BEARINGS
STAND 1 OFF B M S

# READERS' QUERIES

**DO NOT FORGET THE QUERY COUPON ON THE LAST PAGE OF THIS ISSUE**

**This free advice service is open to all readers. Queries must be of a practical nature on subjects within the scope of this journal. The replies published are extracts from fuller replies sent through the post: queries must not be sent with any other communications: valuations of models, or advice on selling, cannot be given: stamped addressed envelope with each query. Mark envelope clearly "Query," Model Engineer, 19-20 Noel Street, London, W.1.**

## Valve travel

I am building *Tich* and have reached the stage of making the eccentric rods. I find that when I measure with dividers, shifting the crank until I get equal readings on front and back dead centres, that the angle of the expansion link is very acute, and the valve travel is round about $\frac{1}{8}$ in.

As the valve has $\frac{1}{16}$ in. lead and the full port opening is 3/32 in., should the valve travel be $\frac{5}{16}$ in. and the swing at the expansion maybe a little more to allow for die slip? I may add that the die block slides freely without moving the link or combination lever, and my final measurement for the eccentric rod is just a fraction off the given one of $2\frac{1}{8}$ in.

I find that the block does not slide easily with the acute angle, the valve rod fork is pretty near touching the gland nut (when it is screwed home) and the distance from wheel centre to crank centre is well over $\frac{3}{8}$ in.—J.B.H., London, S.E.13.

▲ *Regarding your* TICH, *you have erred over the lead. This should be about 1/64 in. not $\frac{1}{16}$ in. Full gear valve travel should be two (lap + port opening) and is about $\frac{5}{16}$ in. in this design.*

*From your description, we think you have set your return crank to give much too great a movement to the expansion link.*

## Reach rods

I am building LBSC's $3\frac{1}{2}$ in. gauge *Princess Marina* and have reached the valve gear assembly stage. At this point I am unsure of the correct position of the reversing lever assembly. According to the instructions, the assembly should be fitted on the top of the rear buffer beam $\frac{7}{8}$ in. from the outside of the main frame. As the reversing arm is set only $\frac{3}{8}$ in. from the outside of the mainframe, the straight reach rod shown in the blueprint would not fit correctly unless it was set to compensate for the different positions of the two connecting points.

May I please be advised if the reach rod should be cranked in order to overcome this difficulty?—A.R., Belfast.

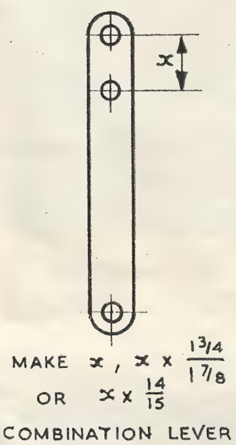
▲ *You are correct in stating that the reach rod should be cranked to connect the reversing arm to the reversing lever and stand. The latter is set further out from the centre line of the locomotive to give clearance alongside the firebox. It is a good plan to cut out a cardboard template (from the end elevation drawing of the firebox, which you probably possess) and use this to check the clearance.*

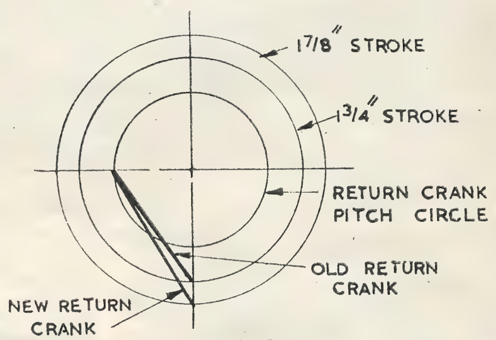
## Loco proportions

I have recently acquired a set of parts and castings for a $3\frac{1}{2}$ in. gauge *Royal Scot* locomotive. Some work had already been done but was of such a poor standard that I have had to scrap most of it. In order to get the driving wheel cranks accurate it has been necessary for me to bore out crankpin holes oversize and this has resulted in the throw being increased, giving an increase in stroke of $\frac{1}{8}$ in.

Could you please tell me what effect this will have on the valve gear, particularly in regard to the dimensions of the return crank and union link? Original dimensions of the Walschaerts gear were piston stroke $1\frac{3}{4}$ in, valve travel $\frac{7}{16}$ in. The piston stroke is now $1\frac{7}{8}$ in. If any alteration is needed would you please suggest the principal measurements?—S.B., Tamworth.

▲ *As the stroke of your* ROYAL SCOT *has been altered, it will be necessary to alter the proportions of the combination lever and the return crank. The drop link and anchor link will probably be all right as they are.*




*Suggested alterations to valve gear of $3\frac{1}{2}$ in.* ROYAL SCOT *locomotive*

## ME projector

I want to fit an a.c. shaded pole driving motor to my ME projector (8 mm. and 16 mm.) to Kinemette's design. The specified motor has stator stampings $3\frac{1}{4}$ in. dia., rotor 1 in. dia., depth of stack $1\frac{1}{4}$ in., and four poles.

Could you please tell me where I could get the necessary stampings, and their pattern number or give me a sketch showing the shape of the poles and the position and size of the shading ring?

The shorted copper bars in the rotor appear to be $\frac{1}{8}$ in. diameter. What is their number please, and the gauge of enamelled wire required for the stator coils and quantity?

If I cannot buy stampings, I propose to cut them myself from sheet iron or steel—hence the request for a sketch. I take it this would be satisfactory?—E.D.S., Usk.

▲ *We regret that we cannot advise you where to obtain the parts for the construction of this motor at the present time. The stampings used were obtained from G. Scott and Co. Ltd, Cromwell Road, Ellesmere Port, Cheshire, but we regret we cannot inform you of the pattern number or*

*give you a sketch of the stampings. As the records and drawings of the design are not now available, we are unable to give you the further information asked for.*

*There are several types of small shaded pole motors available which would suit your purpose. These have been designed for operating tape recorders and for similar purposes. For the particular duty you require, we suggest that the motor should be of the four-pole type, running at 1,425 to 1,450 r.p.m. and with a fairly good starting torque.*

*Laminations cut from annealed sheet iron would be satisfactory for motors of this type, but special alloys, such as Stalloy or Standynis would give better results. The thickness of the stampings should not be more than about 20 gauge.*

*The following firm would probably be able to supply a suitable motor: M. R. Supplies Ltd, 68 New Oxford Street, London, WC1.*

## Wind driven dynamo

I wish to make a windmill arrangement, to drive a 12 v. dynamo for battery charging. I would be most grateful for any information you could give me on same together with the size and arrangement of sails and the wiring necessary.—R.R., London, S.W.8

▲ *We have no detailed information on the design and construction of this apparatus. There are two methods of driving: the first by a more or less normal type of windmill, run at relatively slow speed, and geared to the dynamo to run at higher speed. The other, which is generally recognised as the more efficient, is to use an aerodynamically designed windscrew mounted directly on the dynamo shaft, and run at a sufficiently high speed to suit the dynamo. This, however, requires careful, accurate work on the windscrew, and must be regarded as largely experimental*

## Firing difficulty

I have nearly completed a model of the ME 1 in. scale traction engine and it has run successfully on air but I have run into trouble as far as lighting the coal fire goes. I have got a blower which can be attached to the chimney, and have tried all sorts of fuel from wood, to coal soaked in paraffin; but as soon as the paraffin has dried out the fire goes out. I would like your advice on how to start a fire of this nature and the type of coal to use for stoking up.

Could you please also give me a few details of a suitable water lifter which I could fit if this is a practicable proposition? I would also like to know of a way to make the gunmetal chimney cap look like copper.—A.P., York.

▲ *You should check that air can be drawn through the ashpan without hindrance. The firebars should have spaces of about ⅛ in.*

*Use charcoal soaked in paraffin to start the fire, then after two or three minutes feed dry charcoal until about 20 lb of steam is raised. Finally, Welsh steam coal is fed in, a little at a time, until the whole is well alight.*

*Charcoal can be obtained in the size of walnuts from seedsmen and dealers in horticultural sundries.*

*A drawing of a suitable water lifter, No TE 11/12 for 3s. 6d. post free, can be supplied.*

## Setting valves

Could you instruct me as to the correct method of setting the values of a double-action twin-cylinder steam winch with ordinary D-slide valves with reversing link motion? If I required the reversing lever in the forward position with the engine rotating clock-wise, what would be necessary to make the engine rotate anti-clock-wise with the reversing lever still in the forward position?—A.S.H., Abercynon.

▲ *The rule for setting a normal flat side valve, driven by a single eccentric, is that the eccentric should be set 90 deg. in advance of the crank in the direction of rotation, plus the angle of advance, which is determined by the lap of the valve and the amount of lead, that is, the amount of steam opening allowed at dead centre.*

*To set this type, the position of the valve and its rod should be adjusted so that at its full stroke, the cylinder ports are opened equally at the two ends. Next the crank is set on one of its dead centres, and the eccentric turned on the shaft in the direction of rotation until the steam port at the corresponding end is just beginning to open the least perceptible amount.*

*A check should be made on the opposite crank centre, when the other steam port should similarly be beginning to open.*

*In an engine with link reversing, it is possible to reverse the relation of the eccentrics to the reversing lever by changing over the eccentric-rods at the respective ends of the link, but it should be noted that this also introduces some variations in the characteristics of the valve gear, which may be undesirable in some cases.*

*Our handbook* Model Stationary and Marine Steam Engines *(9s 6d.) gives practical advice on all matters relating to valve gears, etc.*

## SPRINGBOK . . .

*Continued from page 770*

including this week an alternative design using an actual ball race for the big end. The ball bearing suitable is Fischer's single-row self-aligning metric type, No A 413, but I have carefully dimensioned the return crank pin and the bore of the eccentric rod end (in inches) so that no trouble should be caused. The ball races need careful fitting. They should be half-way between a hand-push fit and a press fit for the best results.

For the ball bearing big end, a thin brass cover plate is specified, held on by three 12 BA hexagon steel screws, so we are in for a bit of careful tapping! Incidentally, if anyone has difficulty in getting hold of 12 BA hexagon heads, use a nut lightly riveted to a length of 12 BA threaded rod.

I don't think I need say much about the construction of the eccentric rods themselves, as the work is much the same as already described, but before making them, the return cranks should be properly set.

To do this, first clamp the expansion link in its mid-position—that is a position such that the die blocks can be run from top to bottom of the link without imparting any movement to the valve spindle or combination lever. Put the main crank on front dead centre, and set the return crank as near as possible by eye, to describe a circle of 1½ in. dia., the crank itself, of course, trailing the main crank. With a pair of dividers measure the distance from the centre of the hole in the "tail" of the expansion link to the centre of the return crankpin. Shift the main crank around to back dead centre and apply the dividers without altering them. If they tally, then the return crank is correctly set. If they don't tally, shift the return crank in the required direction by *half* the amount and try again. It's just a bit of trial and error but does not take long. The dividers, when everything is satisfactory, are then at the correct spacing to mark out the eccentric rods; but check on both sides of the engine independently; it is quite likely that there is a slight difference.

★ *To be continued on July 7*

### CORRECTION

Referring to the last column on page 643 of the May 26 issue, it was stated that the screws securing the slide bars to the motion plates should be $\frac{3}{16}$ in. long. The correct dimension should be $\frac{5}{16}$ in. or there would only have been a bare $\frac{1}{16}$ in. length of thread actually in the bars—not very safe!

# POSTBAG

The Editor welcomes letters for these columns. A PM Book Voucher for 10s. 6d. will be paid for each picture printed. Letters may be condensed or edited

## LEVER SAFETY VALVES

SIR,—I am pleased to learn some facts about lever safety valves from E. T. Westbury [Postbag, May 19] and I am grateful for his interest in the matter. There is one point, however, which my lay mind does not grasp. If the valve lever is raised at too high an angle by a too large steam exit, then why is it not raised even higher by a smaller exit, when the space between exit and raised ball is much less in area for a given angle of lift ?

In other words, if a certain volume of steam must escape from the valve before its weight shuts it, then it seems to me that a minimum lever lift will be produced by a steam exit of large rather than small cross-sectional area. I would be pleased to receive correction on this reasoning.

Another interesting point would be the effect of having the lever a few degrees lower than horizontal, so that the maximum weight became effective after the valve had begun to open.

King's Lynn. A. BEAUMONT.

## GUARD RAILS

SIR,—With reference to the article on the back garden 7¼ in. gauge railway [ME, May 19], the guard rails over the bridge, have, since the article was written, fulfilled their function. About three weeks ago the two articulated cars were being propelled fairly fast, when, on approaching the bridge, a boy in the leading car leaned over to look at the bridge. The offside wheel of the leading bogie derailed, but the nearside wheel was caught by the guard rail and so kept the offside wheel on the bridge sleepers. The bogie came to rest about the middle of the bridge with no damage and in perfect safety.

Anyone who desires to use guard rails on bridges should note that the distance between the guard rail and the running rail should not be less than 1¼ times the thickness of the thickest wheel and tyre on the railway. As the picture of the bridge, showing the guard rails, was not reproduced, it should be explained that the two guard rails are bent to meet each other before the track reaches the bridge.

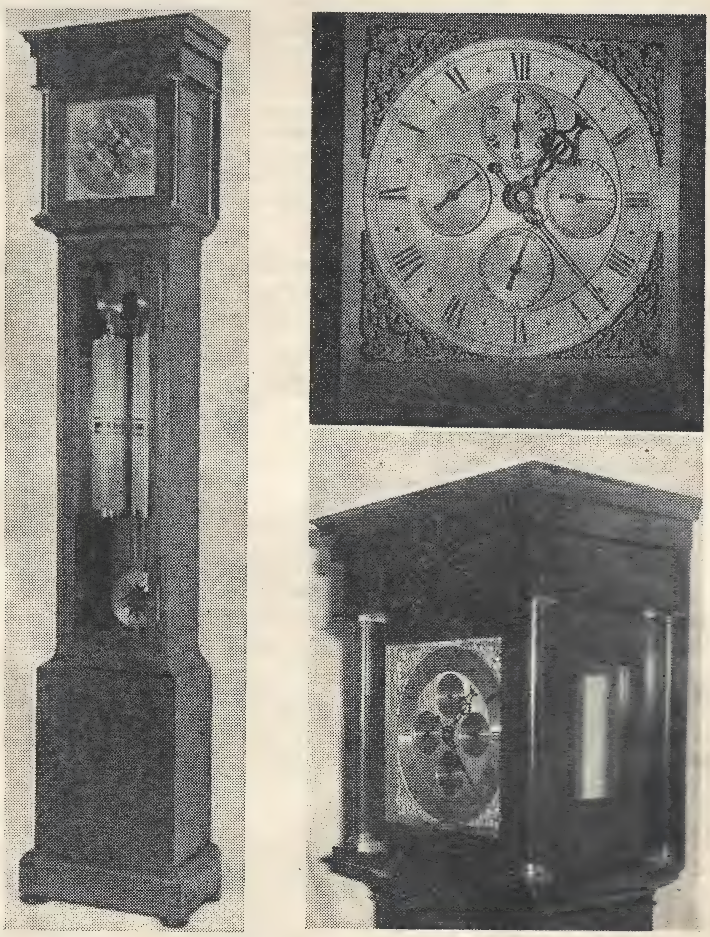
Lymington. E. V. M. POWELL.

## YEAR CLOCK

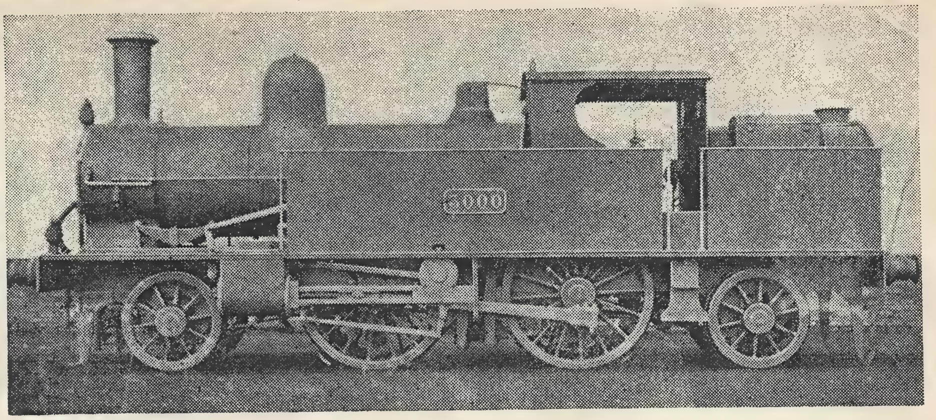
SIR,—Having completed the year clock described by C. B. Reeve in MODEL ENGINEER in July and August 1951, I am sending some photographs of the result in appreciation of the assistance and advice received from Mr Reeve during the long period of its construction.

In the very early stages of manufacture, 1952 I think, Mr Reeve sent me a suggestion for improving his original calendar gear. At this period the import of the alteration was not obvious to me, in fact at that time I was still struggling to get the frame plates flat, but I can say now that the calendar gear operates with unfailing regularity. I want to congratulate Mr Reeve, first on the general layout of his year clock, secondly on his rearrangement of the calendar gear and thirdly on his generous mind and outlook toward amateurs in passing on his hard won experience and ideas.

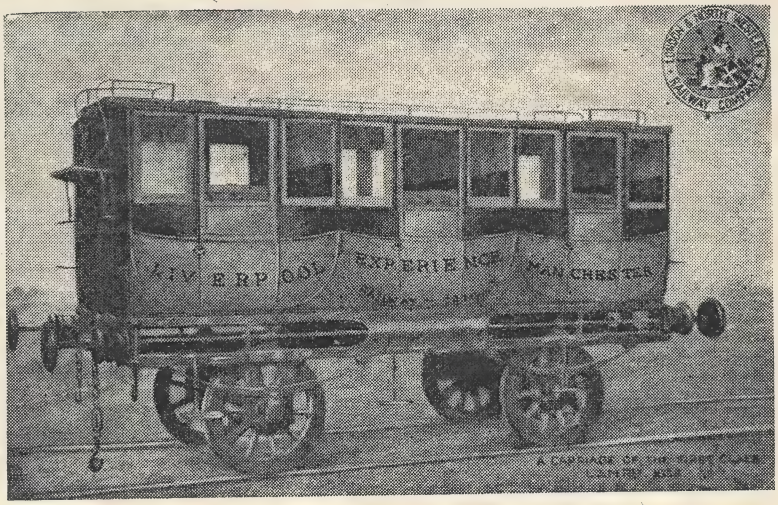
Christchurch, New Zealand. GEORGE W. SMITH.



*Aspects of the magnificent year clock constructed by Mr George W. Smith, of Christchurch, New Zealand, are shown in the pictures above. In his letter on this page, he says the calendar gear operates with unfailing regularity*



*Right: A compound side tank engine of the LNWR built in* 1887 *and exhibited at the Manchester Exhibition in that year. The driving wheels were 5 ft diameter. Below: A first-class carriage of the LMR of* 1838. *Both pictures were sent by Mr C. M. Krelle, of Prescot, whose letter appears in the column below*



## ANCIENT ENGINES

SIR,—These photographs of historical locomotives were given to me by an old Lancashire and Yorkshire Railway driver.

Prescot. C. M. KRELLE.

## RUNNING IN MID-GEAR

SIR,—Your correspondent in his letter " Running in Mid-gear " [Postbag, April 21] is rather surprised that it is not commonplace and widely known, that a steam engine will run in either direction when the valve gear is in mid-position.

In my experience I would be very surprised, if an engine fitted with Stephenson link motion moved at all when the valve gear was in mid-position. As a marine engineer, I can assure readers that steam reciprocating machinery is always manoeuvred on the reversing engine. This operation is called " swinging the links." The radial valve link gear, is swung into either " ahead " gear or " astern " gear by the reversing engine, with the engine stop valve " cracked " or partly open.

When manoeuvring in confined water, such as docks, harbours or alongside wharf or quay and an order to " stop engines " is received in the engine room from the navigating bridge, the engine stop valve is shut and the valve gear run in mid-position. With the gear in this position the engines cease to revolve, as " ahead " and " astern " eccentrics cancel out each other's movements.

The importance of a dead stop will be readily understood, when wire ropes, tugs, barges, etc., could be in dangerous proximity to a revolving propeller—particularly in the case of a partially loaded vessel only just submerging the tips of her propeller blades.

Here is another example of mid-gear position. The engine room personnel decide the low pressure valve gland has to be repacked (soft packing). Before the boilers and engines are shut down at the finish of a voyage, when all is safe and the vessel secured, the low pressure valve gland is slackened off on the studs for perhaps an inch or two. Steam is put on the valve chest, either by impulse or starting valves and the packing " blown." When all is cool it is an easy matter to draw out the packing but always the valve gear is put in mid-position before steam is admitted—*always* !

I cannot agree with your correspondent when he states: " the ability of an engine to run either way in mid-gear is proof of accurately designed, made and adjusted valve gear." I would certainly agree it was unusual valve gear, very original in fact. Finally, when he quotes a valve lead of $\frac{1}{16}$ in. on his $2\frac{1}{4}$ in. bore engine, I can assure him there are hundreds of triple and quadruple expansion jobs still ploughing the seas, developing anything from a few hundred to a few thousand horsepower, whose h.p. leads are no more than $\frac{1}{16}$ in. to $\frac{1}{8}$ in.

Erith. P. R. PRIOR.

## PEAL FOR LOCO

SIR,—I was interested to read, with some sadness may I add, of the ceremony of naming *Evening Star* the last steam locomotive to be built for British Railways [ME, April 7].

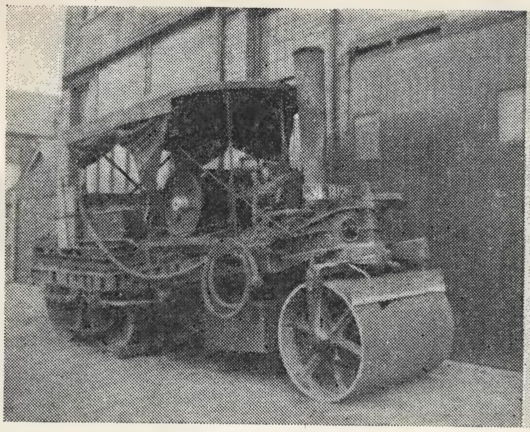
This took place at Swindon Works on Friday, March 18. In *The Ringing World* for April 1, there is a report of church bells being rung to commemorate the occasion. The notice reads in part:

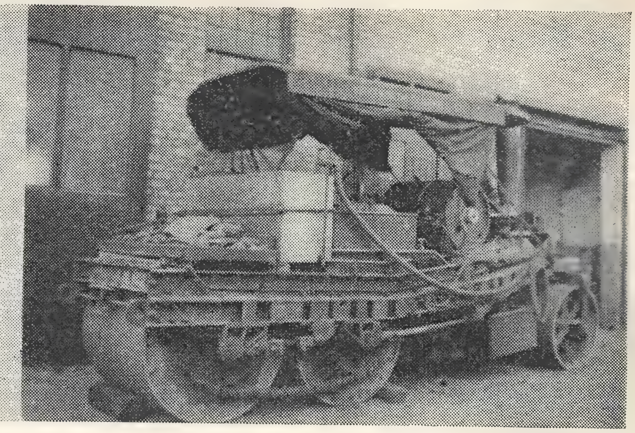
Swindon, Wiltshire
The Gloucester and Bristol Diocesan Association
On Monday March 21st, 1960,
in 2 hours and 47 minutes,
at the church of St. Mark
A Peal of 5040
*Evening Star* Delight Minor
Tenor $11\frac{1}{2}$ cwt.

" Rung to commemorate the last steam engine to be taken into service by British Railways; built at the Swindon Works and named *Evening Star* there on March 18th 1960."

This may be of interest to model engineers who are also ringers.

Vancouver. R. W. HYATT.





*Front and rear view of the unusual Robey tandem roller described in the letter below from Mr B. H. Ingram, of Hartford*

## EXTRA ROLLER

SIR,—I enclose photographs of a Robey tandem roller, taken outside the St Ives works of Oldmans Ltd (Lark Fowells). As will be seen, the roller is rather unusual in that an extra roller has been fitted behind, driven by a roller chain.

An acquaintance who once worked for Goodes, of Royston, well known for Fowler conversions, says that the extra roller was fitted by that firm, and he believes that three engines were converted in this manner.

Hartford. B. H. INGRAM.

*Where are the other two? Does any reader know of their whereabouts?*—EDITOR.

## EMPIRE PRIDE

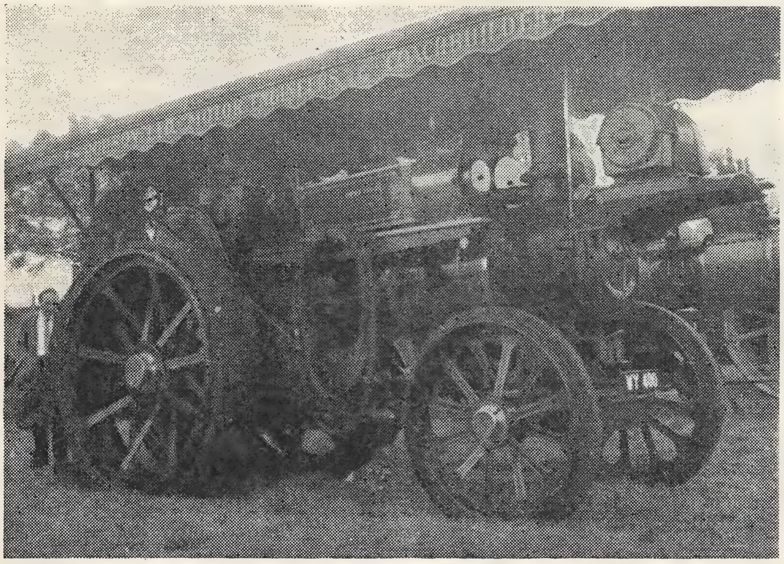
SIR,—With regard to the fine Fowler traction engine on the front cover of MODEL ENGINEER of May 19, surely this is a compound engine?

The operating linkage rod, for the l.p. cylinder, can be seen passing in front of cylinder covers, after leaving the h.p. cylinder drain cocks.

I enclose a photograph of one of these engines *Empire Pride* fitted up as a showman's engine, i.e. disc flywheel, full length canopy and dynamo platform. In it can be seen the h.p. drain cocks, and the linkage before mentioned.

*Compound it! We were singularly wrong.*—EDITOR.

Newcastle. E. H. JEYNES.



*This picture, of a compound traction engine fitted up as a showman's engine, is described by Mr E. H. Jeynes, of Newcastle, who sent it with his letter*

## LIBRARY OF LOCOMOTIVES

*Continued from page 773*

In what forms can the locomotive be modelled? These are numerous. First it can be modelled in any of the three original forms referred to in the issue of ME for May 26 or, alternatively, in any of the four rebuilt forms also referred to in that issue. It would also be possible to model No 773 as built for the Glasgow Exhibition or as rebuilt and numbered 733 or as numbered 377. They could also be modelled as running with oil-burning equipment in 1947 or in the special condition in which No 119 was kept for use as Royal trains. The number of variations can be increased by considering the various liveries. There have been at least three LSWR, four Southern and four British Railways styles since the locomotives first appeared. I don't think one could ask for more variety.

Information on the locomotives can be obtained from the Public Relations Officer, British Railways, Southern Region, Waterloo Station, London SE1. Drawings of the various types of T9 and the fittings on the locomotives can be obtained at a fee from the Chief Mechanical and Electrical Engineer, British Railways, Southern Region, Brighton Locomotive Works, Brighton, Sussex.

My next article will deal with the GWR 4-4-0 No 3440 *City of Truro*.

### CORRECTION

In the article on the T9s in the issue of May 26 it was stated that T9 class 4-4-0s Nos 30915/17-9/29 were in service. This should have read Nos 30715/17-9/29.

★ *To be continued on July 7*

# CLUB NEWS

Send news and notices to The CLUBMAN, 19/20 Noel Street, London, W1.

## ISLE OF WIGHT'S TRACK

The Isle of Wight has long been a favourite haunt of railway enthusiasts and model engineers but I was astonished to learn that the first model live-steam track on the Island was only opened this year. This track has been built in the back garden of Mr John De Bank's house in Lake near Sandown. Mr De Bank, who is secretary of the Isle of Wight MES, tells me that the society is also building a track in the north of the island at Cowes.

Mr De Bank's track is 200 ft long with curves of 15 ft radius and gradients of 1 in 70, and 1 in 85. The track base is constructed from 2 in. × 4 in. wooden posts which have been sunk to a depth of 3 ft to ensure good support. These posts have been joined across the top by lengths of 5 in. × 1 in. timber. The rails are $\frac{3}{4}$ in. × $\frac{1}{4}$ in. black iron welded to sleepers made from $\frac{3}{4}$ in. × $\frac{1}{8}$ in. black iron.

At the first official run four engines tested the track. These were a beautiful 94XX class 0-6-0 pannier tank built by Mr Stanley Slade, of Cowes, a model of a Marsh LBSCR Atlantic built by Mr Ron Shepard, of Wooton, a four-cylinder King class 4-6-0 with vacuum brakes built by Mr Arthur Grimmett, of Shanklin and Mr De Bank's own freelance Atlantic.

## WILLESDEN'S BAD LUCK

Misfortune continues to hit Willesden and West London SME. After negotiating for many months with British Railways about the hire of a disused canteen at Willesden MPD for a clubroom, members were told that BR had decided not to let the canteen after all. The society is still, therefore, without a clubroom.

If anyone in the area knows of suitable premises, I am sure that the secretary Mr L. E. Carter and the members would be most grateful to hear of them. Mr Carter's address is 20 Dunster Drive, Kingsbury, NW9.

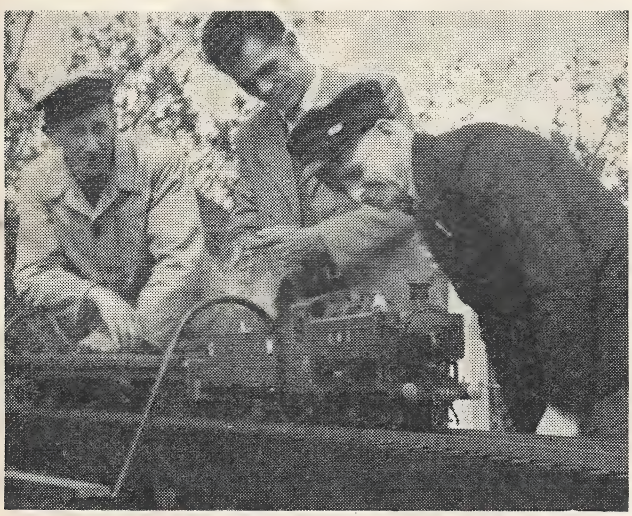
## ELTHAM'S PLANS

The design of club tracks varies considerably and almost every track has a different form of construction. The best portable track I have ever seen is that owned by the SMEE and designed by their track committee chairman Mr W. A. Carter. This is really a masterpiece in design and construction.

Another society which should soon have a fine track is the Eltham and District Locomotive Society. Months have been spent in planning and experimenting under the supervision of the society's vice-chairman, Mr Jim Ewins.

Members and friends who would like to know about its design and the methods to be used in construction should attend the society's next meeting at the Beehive Hotel, Eltham, on July 7 when this will be the subject of discussion.

Secretary: Mr F. H. Bradford, 19 South Park, Crescent, London SE6.



*Mr Stan Slade, of Cowes with his GWR 94 XX class 0-6-0PT prepares for a first run on the new track of Mr John De Bank, at Lake, I.o.W.*

## CLUB DIARY

**June 23 Sutton MEC.** Track night at the track, Chatham Close, Woodstock Rise, Sutton, Surrey.
**June 24 City of Leeds SME.** Erection of track at Guiseley, at 6.30 p.m.
**June 24 Welling MES.** Informal meeting at Welling Library, Bellegrove Road at 8 p.m.
**June 25 Traction Engine Rally.** Rally at the Upper End Farm, Northleach, Gloucester at 2 p.m.
**June 25 Welling MES.** Track run at Green Street Green.
**June 25 City of Leeds SME.** Children's day at Guiseley.
**June 25 Sheffield SMS.** Regatta at Firth Park at 2.30 p.m.
**June 25-26 The West Riding Small Locomotive Society.** Annual Rally at Blackgates.
**June 26 Birmingham SME.** Visit to Bescot MPD.
**June 26 Maidstone MES.** Operation of model race-car and live-steam track at Mote Park at 11 a.m.
**June 26 MPBA (Victoria MPBC).** Regatta at Victoria Park, E. London. Speed and straight running events only.
**June 26 Poole MYC.** Ladies Cup event at 10 a.m.
**June 26 Welling MES.** Visit to the Victoria MPBC regatta at Victoria Park.
**June 26 York City SME.** Visit to York Railway Museum.
**June 27 Chingford and District MEC.** Small gauge night at the HQ, Conway Hall, High Street, Walthamstow, E17.
**JUNE 30 Sutton MEC.** Preparation for the Shovelque at Chatham Close, Woodstock Rise, Sutton, Surrey.
**July 1 Rochdale SMEE.** General meeting (members' work).
**July 1 Warrington and District MES.** Public running on the track at the British Legion Club, Earlestown.
**July 2 and 3 North Staffs and Cheshire TEC.** Alton Towers traction engine rally.
**July 2 City of Leeds SME.** Track meeting at Temple Newsam.
**July 2 Southampton SME.** Track in operation at the St Days Fete.
**July 2 Colchester SMEE.** Portable track in operation at the Colchester Co-operative fete on the recreation ground.
**July 2 Sutton MEC.** SHOVELQUE at Chatham Close, Sutton, Surrey.
**July 2 Leicester SME.** Public running at the track at Abbey Park, Leicester at 2.30 p.m.
**July 2 York City SME.** Co-operative Gala, track in operation at 2 p.m.
**July 3 Birmingham SME.** Social day at Campbell Green.
**July 3 MPBA (Wicksteed MPBC).** Regatta at Wicksteed Park, E. London. Speed and straight running events only.
**July 3 Poole MYC.** Coronet event at 2 p.m.
**July 3 Malden and District SME.** Track day at Claygate Lane, Thames Ditton, Surrey.
**July 3 YM 6m OA and S. London MYC.** The A class Glenham Cup (open) competition at the Rick Pond, Home Park, Hampton Court, Surrey at 10.30 a.m.
**July 4 Chingford and District MEC.** Competition night at the HQ, Conway Hall, High Street, London E17.
**July 5 City of Leeds SME.** Ordinary meeting at the Salem Chapel, at 7.30 p.m.
**July 7 Sutton MEC.** Ordinary meeting at Chatham Close, Woodstock Rise, Sutton, Surrey.
**July 7 Romford MEC.** Track night at the Red Triangle Club, Romford at 8 p.m.
**July 8 Welling MES.** Competition night at the Welling Library, Bellegrove Road at 8 p.m.
**July 9 City of Leeds SME.** Track meeting at Temple Newsam.
**July 9 Poole MYC.** Coronet event at 2 p.m.
**July 9 Birmingham SME.** Cope Methodist School Children visit Campbell Green.
**July 9 Welling MES.** Club activities at the J & E Hall (Dartford) Bi-centenary celebration.
**July 10 Poole MYC.** Tommy Grant Trophy event at 10 a.m.

# Model Engineer

Classified Advertisements together with remittance should be sent to Model Engineer, 19-20, Noel Street, London, W.1. by latest Thursday morning prior to date of publication. Advertisements will be accepted from recognised sources by telephone. GERRARD 8811. Ex. 31.

# CLASSIFIED ADVERTISEMENTS

★ Private: 3d. per word. Trade: 6d. per word. Minimum 12 words. Use of box 2s. 0d. extra.

★ Rates of displayed advertising in this section. Trade 35s., Staff 45s., per single column inch. (Column width 1 7/8 in.)

The Advertisement Manager reserves the right to refuse or suspend advertisements without giving any reason. Every care is taken to avoid mistakes, but the publishers cannot be held liable in any way for printing errors or omissions. Receipt of "copy" for publication implies acceptance of these conditions by the advertiser. Whilst every care is taken to exclude advertisements from doubtful sources, no responsibility can be accepted by the publishers for the bona fides of advertisers.

## WORKSHOP EQUIPMENT

**Buck & Ryan for Lathes and Workshop Accessories,** drilling machines, grinders, electric tools, surface plates, etc.—310-312, Euston Road, London, N.W.1.

**Black & Decker D500 Drill,** plus 10 attachments, everything new, full maker's guarantee, bargain, £7 8s. 6d. lot.—DRYSDALE, 58, Commerce Road, N.22.

**Whiston.** Nuts, switches, gauges, motors, washers, taps, resistances, cable, Allen screws, optical, split pins, thermo-couple, gears, screws, vee-belts, meters, tools, screwed rods, clips, silver steel, insulation, springs, pulleys, solder, tube, relays, terminals, bolts, hex. rod, sandpaper.—WHISTON.

**Exchanges.** Wanted for engineer's small tools, materials, equipment. Anything considered, binoculars, cameras, etc.—Box No. 9646, MODEL ENGINEER Offices.

**Electric Hand & Machine Tools.** New, used, bought, sold. Rock-bottom prices. No lists. Visit—A. DRYSDALE & Co., 58, Commerce Road, N.22.

**Almost New Fobco Star** 1/2" bench drill £30, or with complete sets lettered, numbered and fractional drills to 1/2", £35.—ELLIS, Archer's Angle, Whitfield, Dover. Phone: Kearsney 2552.

**Need New Equipment?** Hire purchase comes easy if you don't smoke. NICOBAN will help you stop or cut down. Send £1 for course to—DEVON CHEMICAL CO. LTD., 181, Topsham Road, Exeter.

**Demster Moore A.G.H.** motorised, 6 1/2", reconditioned, £185. Southbend lathe, £60. Myford M lathe, £52. Myford 4, £26. Miller, £45. 6" shaper, £65. Slotter, £45. Power saw £50. Other m/cs, H.P. arranged.—HAWKINS, Swan Street, West Malling Kent. West Malling 3252.

**Myford ML7** hardly used, motor, 3-jaw, 4-jaw, tailstock, chucks, faceplate, D/plate, changewheels, etc., £60 o.n.o.—CRO 2115, between 9 a.m. and 5 p.m.

**Brazing Lamps** 5-pint, used, good condition, 57s. 6d. each.—GUTHRIE, Crossgate Hall, Dalkeith, Scotland.

**Summer Clearance of New Equipment.** Flexispeed Miller with c/shaft and M/c vice, £31 10s. (usually £35). Flexispeed 1 7/8" lathe, B.G. auto traverse, chuck, £12 10s. (£15 8s.). Flexispeed 2" lathe, B.G. auto traverse, with chuck, tool turret and 4-jaw chuck, £17 10s. (£19 10s.). Selecta Uni-Mat universal metal workshop, 230/250 volts, £21 10s. (£26 17s. 6d.). We have a good range of new and used equipment, can we help you! Exchanges and part exchanges considered, also we are open to purchase good equipment either model or machinery.—TOM MALLABY, 223, Lake Road, Portsmouth. Telephone: 21917.

**CLERKENWELL SCREWS LTD.,**
**107/109, Clerkenwell Rd., London, E.C.1**
*Hol.*: 1215 & 6504
Solicit your enquiries for turned and rolled screws 0-16 B.A., turned and pressed nuts, washers, etc. All in brass and steel. (Minimum one gross any one item)
24 hour service stock lines, best discounts. C.O.D. parcels sent anywhere. Send for free lists.

**Wanted. Champion No. 2** drilling machine with or without motor.—OCCUPIER, Ballacreg Glenvine, Crosby, I.o.Man.

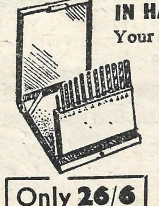
**Brand New Tools for Sale.** Centreline 1/4" square lathe tool-holders, straight adjustable height, first-class tool, price, 12s. 6d., worth 25s. Darwin H.S.S. tool bits, 1/4" sq. 2 1/2" long, 1s. 8d. each. Ditto 5/16" sq., 2s. H.S.S. parting tools, length 3", price, 3s. 9d. Sets of 11 hand parallel reamers, one each size, 3/16", 7/32", 1/4", 9/32", 5/16", 11/32", 3/8", 13/32", 7/16", 15/32", 1/2", price 27s. 6d., worth over £5. H.S.S. metal slitting saws up to 2" dia., six assorted, 10s. 6d. Ditto 2 3/4" dia., all 1" hole, six assorted, 13s. 6d. Precision needle files, six assorted, 4s. 3d., worth 12s. Whitworth thread gauges, 28 blades from 4 to 62 t.p.i., price, 3s. 6d. 5" toolmaker's clamps, 8s. each, worth 16s. Universal sharpening stones 4" × 1", smooth and medium double-sided, price, 2s. 6d., worth 5s. 6d. Please add 1s. 6d. towards postage on orders under 30s. C.O.D. 1s. 6d. extra.—A. E. KING, 152, Halfway Street, Sidcup, Kent.

**E.W. 2 1/2" B.G.S.C. Lathe,** complete with standard equipment, motor and countershaft. All as new, £25 or offers, carriage paid.—BECK, 67, Town Street, Shepton Mallet, Somerset.

**Wanted. ML7** with or without equipment, or contents small workshop London area, cash.—GOODCHILD, 2, Isabella Road, Homerton, London, E.9.

**Myford ML7 and Accessories.** Fobco Star drill. 6" shaper. Small 24 v. motors. Heywood compressors. Selenium rectifiers. Combination set, etc. S.A.E. details.—HOARE, Chapel Road, Terrington, St. Clement, King's Lynn.

**FOR THE ENGINEER**
**'PRESTO' DRILL INDEX SETS IN HANDSOME METAL CASE**



Your choice of a drill immediately available. These Twist Drills are made of highest quality British High Speed Steel. 13 Drills in all, suitable for all metals. Fit electric or hand drills. In strong flat pocket size case. Sizes marked on case for easy access. All handymen need these drills. Sizes 1/16" to 1/4".

**Only 26/6**
**P. & P. 1/- extra**

**Cash with order.**
**ARTHUR DRYSDALE & Co. Ltd.,**
*Electric Tool Merchants*
**58 Commerce Rd., Wood Green, London, N.22**
*Tel: Bowes Park* 7221

**Champion Drilling Machine** 1/4" Jacob chuck, 1/4 h.p. B.T.H. motor, little used, £10. —3, Peters Close, Stanmore. Phone: Grimsdyke 1851, after 6 p.m.

**Brand New. Burnerd Independent Chucks,** 4" £4. Dies 13/16", 40 t.p.i., 5/32", 3/16", 7/32", 1/4" each, 3s. 9d. Taps 40 t.p.i., 5/32", 3/16", 7/32", 1/4", each 2s. 3d.—SHAW, 7, Hengist Street, Manchester, 18.

**For Sale. Myford ML7** heavy duty lathe, mounted tray-top, cabinet. Churchill 1/2" precision 1/2 h.p., 3-speed drill, complete set Myford accessories. Above tools as new, many unused, owner retired engineer. Letters or appointment to view.—BERRY, 21A, Third Avenue, Bridlington, E. Yorks.

**Wren Fine Flame Gas Blowpipe** for all delicate soldering and silver solder jobs, 3s. 6d. Wren 9" roaring flame gas blowpipe (self-blowing) for model brazing. Wren fiercest spirit pocket blowpipe on the market, 5" roaring flame, 10s. Wren paint lining tool, rolls three different sized stripes, 5s. 6d. Al post paid, return within seven days if unsuitable, money back by return.—R. WREN MFR. CO., Wollaston, Wellingborough.

**Brass Squares and Hexs.** 3/16", 9d.; 1/4", 1s. 4d.; 5/16", 1s. 10d.; 3/8", 2s. 5d.; 1/2", 4s. 1d.; 3/4", 9s. 6d.; 1", 17s. per ft., plus postage. S.A.E. for list.—B. J. HARRIS, The Cottage, Corngreaves Hall, Cradley Heath, Staffs.

**Wanted. Myford Vertical Swivelling Slide.** ML4 improved tailstock. Bench vee countershaft. Faceplate 6 3/4"-9", 1 1/8" × 12". 4"-6" independent. Wanted. ML7 good, lowest possible. Cash.—26, Church Brow, Mottram, M/c.

**Sale. Motorised ML7 Myford** bench lathe, as new, three chucks, tools, etc., nearest £60.—ALBERT BARUGH, Rainton, near Thirsk, Yorks.

**Mellor Bench Lathe** for sale, 3 1/2" centre, screwcutting, faceplate. All equipment including motor, £35. Telephone—Ravensbourne 5255.

**Wanted. Small Surface Grinder,** approx. 8" traverse, shaper approx. 8" stroke. Also small power saw.—Box No. 9675, MODEL ENGINEER Offices.

**Unused Self Centring 6" Chuck,** two sets jaws, key backplate casting, £8. Adjustable reamers, 1 9/32" to 1 15/32", 1 3/16" to 1 11/32", 15/16" to 1 1/16", 21/32" to 23/32", 19/32" to 21/32", 15/32" to 17/32" fixed reamers 9/16", 1/2", 5/8", 19/32", 5/16", 1/4", 3/16". Taper pin 0, 4, 6, 15, £5. Very old mahogany folding table, £14. —Box No. 9681, MODEL ENGINEER Offices.

**For Sale.** Bull Finch self-blowing gas torch, [illegible] new, £4. Apply—Box No., 9683, MODEL ENGINEER Offices.

## MODELS AND FITTINGS

**Wanted.** Any "1" gauge or larger tinplate locomotives or stock. Good prices paid.—Box No. 9659, MODEL ENGINEER Offices.

**Sale. 5" Gauge 0-4-0** coal-fired saddle tank locomotive, excellent working order, £85 or offers.—REEVES, 34, Carr Lane, Acomb, York.

**For Sale.** Two-third completed "Titch" 3 1/2". Also seven bound vols. "Model Engineer," other issues, bargain £12.—"Inglenook," Holly Road, High Lane, Stockport, Disley 93183.

**DICK SIMMONDS & CO**
**5 South Road, Erith, Kent**
Drawings and materials for our celebrated 0-4-0 Tank Loco "Hercules" in 7¼" Gauge. "AJAX" in 5" Gauge and "BEATRICE" in 3½" Gauge. We hold large stocks of castings for many "L.B.S.C." Locos at keen prices.
*We are specialists in Boiler Construction and we braze customers' boilers.*
LISTS FREE FOR S.A.E.

**For Sale.** 7¼" essential parts for locomotive, best workmanship.—Box No. 9660, Model Engineer Offices.

**American Enthusiast** wishes to purchase 1" or 1½" scale locomotive, preferably of the tank type, such as "Jubilee." All letters will be answered. Please address.—J. S. Corrigall, 230 Park Avenue, New York 17, New York, giving all details and photographs if possible. Photographs will be returned promptly.

**Wanted.** Large model steam engines, any type considered. Must be complete and in working order.—Box No. 9658, Model Engineer Offices.

**Hornby-Dublo (Three-rail). Items:** (1) Tank locomotive 2-6-4; (1) "Duchess" locomotive; (1) "Duchess" tender; (4) Coaches L.M.R.; (1) Wagon with drums; (1) Meat van; (1) Petrol tank; (1) Goods brake van; (1) Cattle truck; (1) High capacity wagon; (1) Coal wagon; (1) Goods van. **Rails:** (28) Straight rails, 11½"; (4) Straight ½-rails; (20) Curved rails; (6) Curved ½-rails; (1) Elect. opp. points; (5) Ord. points; (5) Isolating rails; (1) Uncoupling rail; (4) Switches for points/signals; (3) Switches for isolating rails. **Accessories:** (1) Buffer; (1) Footbridge; (1) Level crossing; (1) Loading gauge; (1) Water crane; (1) Signals elect. opp., Home; (1) Distant; (1) Double; (1) Controller; (1) Transformer. £10 the lot.—W. Law, 104, Brim Hill, Finchley, N.2.

**A Visitor to England** would like to buy an 0-4-0 or 0-6-0 5" gauge tank. Would also like to purchase headstock and tailstock for a wood lathe with 5" centres.—Box No. 9668, Model Engineer Offices.

**Wanted.** Square faced lantern (right) for Burrell showman's engine, pair would do.—Middlemiss, Bellingham, Hexham.

**For Sale. Stuart No 4A** reversing steam engine, first-class exhibition finish, £18 10s. Also brand new 5" gauge "Maid of Kent," recently completed, powerful passenger hauler. S.A.E. for details.—J. Knighton, 92, Park Drive, Ilkeston, Derbyshire.

**Wanted.** Boiler upright to steam, at least 1" bore, 1" stroke, must be good.—Box No. 9685, Model Engineer Offices.

**G.N.Rly. 5" Gauge Atlantic,** complete chassis assembly, cylinders, valve and driving motion, leading and trailing bogies, etc. All as a complete working unit, finished boiler and smokebox, together with many fittings. Outstanding workmanship, valued at £65, price £25 or nearest.—Campbell, 33, Fengates Road, Redhill, Surrey. Tel.: 5221 evenings.

**Wanted.** 1" or ¾" scale rail. Details.—Larkam, 51, Overdale Road, Derby.

**G.W.R. 3½" Gauge** 4-6-0 County Loco coal-fired, moderate condition, any reasonable offer accepted.—Hendry, 15, Hill Road, Chelmsford, Essex.

**Hornby "OO"** (cost £20). Tank locomotive and wagons, rectifier control unit, electrically operated accessories, 20' rail, £[illegible] o.n.o. —2, Belle Vue Road, Downe, Kent. Farnborough (Kent) 53800.

**5" g. B.I SPRINGBOK**
**Castings in NICKEL CAST IRON**
**Close grain—smooth finish—easy machining**
**Send S.A.E. for free list; also for Hielan Lassie.**
**Tools and Materials Catalogue 9d.**
**Locomotive blueprint and casting catalogue is being reprinted.**
***Overseas orders a speciality***
**KENNION'S**
**2, Railway Place, Hertford, Herts.**
**Open Saturdays Phone 2573**

**Wanted. Castings and Drawings** 7¼" locomotive, preference for Southern Schools, offers.—Box No. 9673, Model Engineer Offices.

**5" or 7¼" Locomotive Wanted.** Also 1"-3" model traction engine, don't mind repairs, and would collect.—Box No. 9674, Model Engineer Offices.

**For Sale.** Complete blueprints gauge "1" steam coal-fired 2-6-2 "Jack Horner" L.B.S.C. design. Complete sets M.E. 1911-1942. Incomplete sets 1943-1957. Model Railway News, complete sets from 1931. Odd copies Autocar 1898-1902.—Box No. 9676, Model Engineer Offices.

**Superb 3½" Gauge "Hielan' Lassie"** locomotive and tender. Engine built to the finest detail, complete with working brake gear, leaf springs, etc., but minus boiler. All materials and fittings to finish, £70.—Box No. 9678, Model Engineer Offices.

**Bassett-Lowke,** two "O" gauge steam "Moguls" in L.M.S. colours, perfect condition, each £14, two for £27 10s. Fine twin-cylinder marine engine, about ⅝" × ⅝", £20.—Box No. 9679, Model Engineer Offices.

**Wanted. Powerful Steam Engine** for launch hull, suitable flash steam and ordinary boiler.—Box No. 9680, Model Engineer Offices.

**Good Price for High Class Dasv.** vertical with reverse, must be smaller than 1" × 1". —Box No. 9684, Model Engineer Offices.

## ELECTRICAL

**A.C. Motors Self-start** induction, 200/250 v., 50 cycles, 1-phase, 1,425 r.p.m., ¼ h.p., 72s. 6d., 1/3 h.p., 97s. 6d., ½ h.p., £6 5s. Perfect and guaranteed, carriage England, 7s. 6d.—Johnson Engineering Company, 319, Kennington Road, S.E.11. Reliance 1412/3.

**Synchronous Clock Motors.** 200-250 v., a.c., 50 c. with geared mechanisms. Various types, large stock, 7s. 6d. each. Quantity reduction.—Tradex Meter Company Ltd., 67, Maple Road, Surbiton, Surrey. Tel.: ELMbridge 2234/5/6.

**Genuine R.N. Stuart-Turner-Stuart** generators. 110 v. d.c., 1.5 kW. Comprises engine and spare engine on common base, instant changeover. Crated ready despatch, £50 each (carriage forward). 50 a.h. Nife batteries, 8s. cell.—Marble Arch Supplies, 286, Camberwell Road, S.E.5.

**Self-starting Synchronous** clock-type motors, 200/250 v., a.c., 50-c., 6s. 6d. each, carr. paid.—Graham & Co. Ltd., 73, Acre Road, Kingston-on-Thames, Surrey. Phone: KINgston 0075.

## BUSINESS SERVICES

**Capacity Available** prototype small batch work, turning, milling, drilling, etc. Phone: EDG 4572.—Box No. 9669, Model Engineer Offices.

**Advertiser Wishes Contact** precision engineer capable producing small plain M/S turned spindles, ground finish, case hardened in quantity. Write—T. H. Wood, 25a, Gray Street, Dundee, Natal, S. Africa. Drawings provided, quotations wanted.

## CARS, MOTOR CYCLES, ETC.

**Wolseley Fifteen-Fifty,** saloon 1958(July), 18,200 miles, taxed end year, one owner, undersealed, seat covers, immaculate condition. Written guarantee, good reason for selling, £750 o.n.o.—Kemp, Glenwood, Pelling Hill, Old Windsor. Phone: Windsor 1960.

**A Traction Engine** in nearly new condition, 7 n.h.p. Foster (Lincoln) for sale. Owner living abroad. Beautiful runner, taxed, insured, £300 for quick sale. Stamp for photograph. Write—Box No. 9677, Model Engineer Offices.

**1934 Sentinel S.4.** In excellent mechanical condition. New crankshaft bearings and valves fitted to engine. Apply to—The Wingham Engineering Co. Ltd., Wingham, Canterbury. Tel.: Wingham 202.

**Sale.** Silver Ghost chassis, and attractive Phantom 11. Many spares.—Rosewarne, Ackworth School, Pontefract.

## GENERAL

**Compressors for Sale.** Twin piston with tank, 2½ cu. ft. per min, £4. Single cyl., £2. All types motors. S.A.E. for list.—Wheelhouse, Dept. M.E.C., 13, Bell Road, Hounslow. Phone: HOU 3501.

**Govt. Surplus.** S.A.E. for list.—S. Midgley, Richmond, Hebden Road, Haworth, Keighley.

**Unowot Whiston's Sell.** S.A.E. catalogue 4,000 items. 100 useful mixed lots.—Whiston (Dept. M.E.S.), New Mills, Stockport.

**Compressor Equipment,** aqualungs, miscellaneous items, etc.—Pryce, 157, Malden Road, Cheam.

**Build Your Own Refrigerator.** Everything to make built-in or cabinet refrigerator. S.A.E. for sealed unit list and schematic diagram or 1s. (refundable) for 32-page catalogue including details of free 4 cu. ft. cabinet diagram offer. Hire purchase available.—Wheelhouse, Dept. M.E.R., 13, Bell Road, Hounslow. Phone: HOU 3501.

**West Riding Small Locomotive Society** annual rally June 25-26, Blackgates, Tingley, Wakefield. Refreshments, every amenity, send for brochure. Honorary secretary—W. D. Hollings, 8, Limetree Grove, Birkenshaw, Bradford. Telphone: Bradford 681266.

**Patents.** "Model Engineer" reader wishes to purchase suitable to start a small factory, electrical, metal or woodworking, confidential. —Box No. 9637, Model Engineer Offices.

*Make your own*
**ASTRONOMICAL TELESCOPE!**

| | |
|---|---|
| 1⅝ in. ACHROMATIC OBJECT GLASS (Ex-Govt.) 20 in. focus .. .. | 10/6 |
| EYEPIECE LENS .. .. .. | 2/6 |

*Microscopes—Objectives, Eyepieces and Slides always in Stock.*
*Write stating your requirements.*
**BROADHURST CLARKSON & Co. Ltd.**
**63, FARRINGDON ROAD, LONDON, E.C.1.**
**Phone: HOL 2156**

**Wanted.** Copy of the book "Steam and the Steam Engine," D. H. Clark.—Thos. Reid, 202, Riverside Road, Kirkfieldbank, Lanark.

**Wanted.** American "Locomotive Cyclopaedia," published by Symons Boardman.—162, Ironmill Lane, Crayford, Kent.

**Six Wheel Foden Steam Wagon,** solid tyres, good order, ample spares, price £100. —P. Atherton, Willow Farm, Twyford Lane, Bold Widnes, Lancs.

**Technical Aldis U.N.O.** ¼-plate camera, all metal construction, triple extension, rising tilting, cross and swing front, quick release lens, removable focus screen, cable release, f. 7.7 anastigmat lens, plates, etc., £25 or exchange, partly built loco. or T.E.—Box No. 9682, Model Engineer Offices.

## BACK NUMBERS

**Sale. "M.E."** vols. 102-121 inclusive, spotless.—Wake, 13, Dalton Avenue, St. Helen Auckland, Bishop Auckland, Co. Durham.

**"Purley Grange"** complete back numbers containing L.B.S.C. building instructions required.—Ellis, 46, Fernhill Avenue, Weymouth.

**Beautifully Bound Volumes** of the "Model Engineer," prices: Volume 15-27, 10s. each; volume 35 and 48, 12s. 6d. each; volume 61-90, 15s. each; volume 90-121, 30s. each.—Taylor, Holly Bank, Yatton, Somerset. Tel.: Yatton 3332.

Printed in Great Britain for the Proprietors by Electrical Press Ltd., Cordwallis Works, Maidenhead, Berks and published by Percival Marshall & Co. Ltd., 19-20, Noel Street, London, W.1.
Registered for transmission by Magazine Post to Canada including Newfoundland.

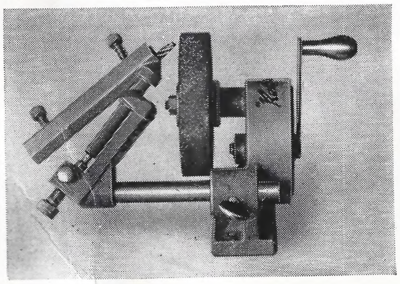
**ME QUERY COUPON JUNE 1960**

# BUCK & RYAN Ltd

TOOL MERCHANTS

**NEW! RELIANCE TWIST DRILL SHARPENER**

**RAPID—EASY TO USE—MAXIMUM CAPACITY: 5/16" DIAM.**



PRICE **45/-** POST FREE as illustrated

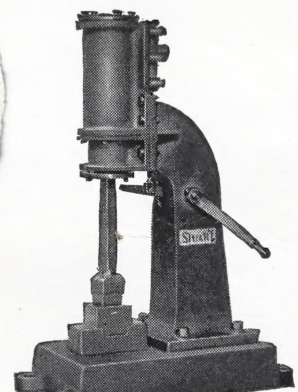
**CAN BE FIXED TO BENCH OR DOOR POST OR CLAMPED TO TABLE**

We always have in stock, a wide range of equipment for the model engineer

**310-312, EUSTON ROAD, LONDON, N.W.1**
Tel. EUSTON 4661
**AND AT 261, EDGWARE ROAD, W.2**

---

# STUART STEAM HAMMER



**Once again we illustrate the Steam Hammer. It is not the model for the beginner, who should start on the No. 10, but it is an exceptionally interesting model for the more experienced amateur.**

*Fully described in our complete catalogue. Price 1/-, post free.*

**STUART TURNER LTD.**
HENLEY-ON-THAMES, OXON.

---

**"SUPA" H.S. Steel Tool Bits,** 1/4" square, 2 1/2" long 8/6 doz. 5/16" square, 3" long, 12/- doz. 3/8" square, 3" long, 17/6 dox. 7/16" square, 3 1/2" long, 25/- doz. Hardened ready for use.

**250 Adjustable tap wrenches** 3/8"-1/2" capacity, 8/6 each.

**5,000 Ball Races,** standard o.d. 1/8" bore, 2/-, 3/16", 2/-, 1/2", 3/6, 5/8", 4/6, 1", 6/6, 2 1/2", 12/- each. Also 6 or 9 mm., 1/- each.

**Six Tons Precision Ground Silver Steel,** 36" lengths: 1/4", 9/32", 3/8", 1/2" dia., 10/9 lot. Also 9/16" and 5/8" dia., 10/- each. Also 13" lengths, 1/16" to 15/32" dia., doz assorted 5/6.

**1,000 H.S. Inserted Blade Expanding Reamers,** 21/32" to 3/4", 16/- each; 25/32" to 27/32", 18/6 each; 27/32" to 31/32", 18/6 each; 31/32" to 1 1/8", 22/6 each; 1 1/8" to 1 9/32", 27/6 each; 1 9/32" to 1 15/32", 35/- each.

**H.S. Taper Pin Reamers,** 4 and 7, 3/9 pair.

**Brass 26 Thread Taps and Dies,** 2 1/4" dia. split dies, cutting 5/8", 3/4", 7/8", 1" dia., 30/- per set, also taps to suit, 15/- per set, taper or plug, die-stock 12/6 each.

**American Fine Thread Dies,** auto, 9/16", 5/8", 3/4", 7/8", 1" with die-stock, 50/- set; taps to suit, 20/- set.

**H.S. Parting Tool Blades,** 3/32" × 3/4" × 5", 5/- each.

**Toolmakers' Needle Files,** good assortment, 12/6 doz.

**5,000 Taps, 1/8" to 3/8 dia., Assorted Threads,** suit M.E. or experimenter, mostly fine threads. twenty assorted, 3/9.

**5,000 Ball Races,** standard o.d. 1/8" bore, 2/-; 3/16", 2/-; 1/2", 3/6; 5/8", 4/6 each. 6 or 9 mm., 1/- each.

**2,000 Hand Reamers,** sizes 5/16", 3/8", 7/16"—3/6 each. Also 5/8", 11/16", 4/9 each.

**7,000 Pratt & Whitney Circular Split Dies,** superior quality precision ground cutting edges, 13/16" dia. suitable for machine or hand use. Sizes 0, 2, 4, 6 B.A., 8/6 per set, also 8, 9, 10, 11 B.A., 3/- each. 13/16" die stock, 3/6 each.

**Extra Special Carb. Grinding Wheels Offer.** 6"-7" dia., 1/2", 3/4" thick, 1/2" or 3/4" hole, 10/- the three, postage 2/-. Value over 30/-, 6 for £1, post paid. Ass. grits for tool and cutter grinding.

**3,000 High Speed Routing Cutters,** straight shank, two lip, as used for cutting slots in wood, size 3/8", clear 4/- each.

**5,000 High Speed Slitting Saws and Slotting Cutters,** 2 1/4" dia., 5/8" bore, 0.057", 0.064" thick, 3/9 each. 2 3/4" dia., 1" bore, 0.036", 0,048", 0.051", 0.056", 0.064", 0.072", 0.080" thick, 3/9 each. 3" dia., 1" bore, 3/64", 5/64" thick, 6/- each. 3 1/2" dia., 1" bore, 3/64", 9/64", 5/32", 11/64" thick, 7/6 each. 5" dia., 1" bore, 5/64" thick, 12/6 each. 3/16" thick, 12/6.

**1,000 High Speed Side and Face Cutters,** 2 1/2" dia., 1" hole, 3/8", 1/2" thick, 15/- each. 3" dia., 1" hole, 1/2", 5/8" thick, 20/- each. 3 1/2" dia., 1" hole, 3/8", 3/4" thick, 25/- each.

**1,000 H.S. Long Straight Shank Twist Drills** approx. 1/16" and 3/32" dia., both 4 3/4" long, 2/6 pair. Approx. 3/16" and 3/8" dia., 6" and 7" long, 5/- the two. 9/64" dia., 11" long, 3/6 each. Approx. 13/64" dia., 10" long, 4/6 each.

**500 Sets Hex. Die Nits.** Sizes 1/4", 5/16", 3/8", 7/16" and 1/2" Whit., B.S.F., American Car thread or 26 brass thread. These sets are in a neat case. Present day value over 30/- per set, to clear 15/- per set any thread. Two sets 28/6, four sets 55/-. Alos 5/8" and 3/4" in Whit., and B.S.F. only, 5/8", 5/- each; 3/4", 6/- each, 10/- per pair.

**2,000 Small H.S. Twist Drills,** approx. 1/32"-3/32", 4/- doz. Approx. 1/16"-1/4", 7/6 per doz. Approx. 9/32"-15/32", six for 10/-.

**3,000 Circular Split Dies,** 1" dia. cutting 1/4", 5/16", 3/8", 7/16", 1/8" Whit, B.S.F., also brass thread, 26 thread all sizes and American N.F. 12/- per set of 5 sizes, 2 sets 22/6, 4 sets 42/6. Taps to suit 12/6 per set, either taper or second or plug. 1" dia. stocks 6/- each.

**Metal Marking Punches,** sizes 3/32", 1/8" and 1/4", figures 8/6 per set, letters, 25/- per set, any size. 1/2" figures, 15/- set.

**2,000 Straight Shank End Mills,** size 1/8", 5/32", 3/16", 7/32", 1/4", 5/16", 15/- set, also 3/8", 7/16", 1/2" ditto, 12/6 set.

**1,000 Bevelled Wood Chisels,** handled, 1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1". Actual value, 37/6. Gift 25/- set.

**1,000 Semi High Speed Centre Drills,** Slocombe brand, 5/16" body dia., 3/32" point, 1/6 each. 16/6 per doz.

All items brand new, £1 order post paid, except overseas.

# J. BURKE

192 Baslow Road, Totley,
Sheffield.

**Inspection Only at Rear 36 Fitzwilliam St., Sheffield.**

Teal